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THE
PROCEEDINGS
OF THE
ZOOLOGICAL SOCIETY
OF
LONDON.

WITH ILLUSTRATIONS.

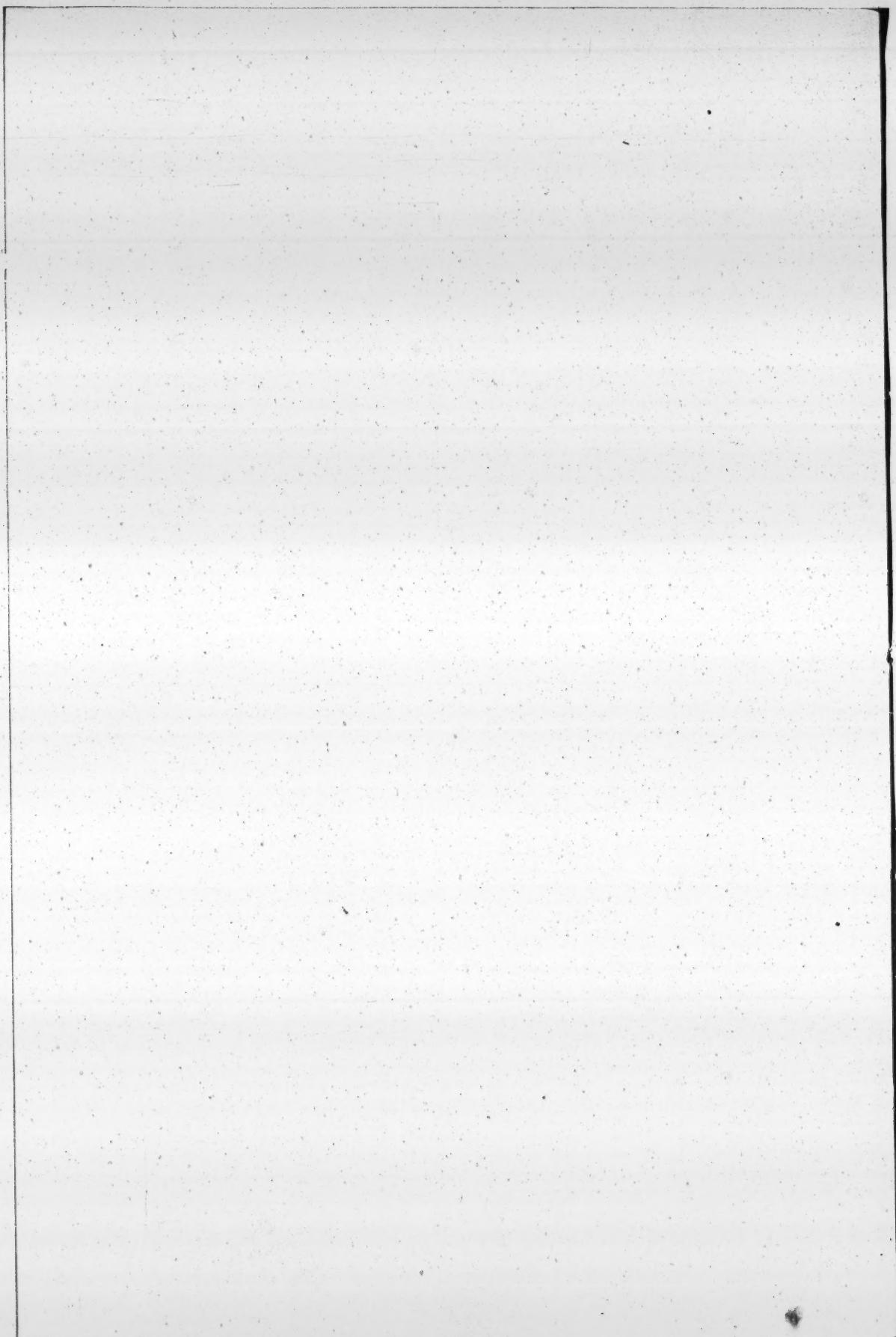
1850.

PART IV.
NOVEMBER—DECEMBER.
CONTAINING SIXTEEN PLATES.

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the middle of the leg ; horns in both sexes elongate, subcylindric, with the basal branches and tip dilated and palmated ; of the females smaller ; skull with rather large nose-cavity, about half as long as the distance to the first grinder ; the intermaxillary moderate, nearly reaching to the nasal ; a small, very shallow, suborbital pit.

They live in the Arctic Regions in both hemispheres, migrating in flocks, and eating lichens.

1. TARANDUS RANGIFER. The CARIBOU OR REIN DEER.

Dark brown in summer, grey in winter. Young : brown, yellow varied.

Tarandus, Plini.—*Rangifer*, Gesner.—*Cervus Tarandus*, Linn.; Pallas, Zool. Ross. A. i. 106 ; Cuvier, Mamm. Lith. t. ; Bennett, Gardens Z. S. 241. fig. ; Richardson, Fauna Bor. Amer. 238.—*C. Tarandus sylvestris* (*Woodland Caribou*), Richardson, Fauna Bor. Amer. 250.—*C. rangifer*, Raii Syn. 88.—*C. platyrhynchos*, Vrolich, Rendier, t. 2 (1828).—*C. palmatus* and *C. mirabilis*, Jonston, Quad. t. 36, 37.—*Tarandus rangifer*, Gray, Knows. Menag. 57.—*Rein Deer*, Pennant.—*Caribou*, Sagard. Theodat. Canad. 751.—*Renne*, Buffon, H. N. xii. 79. t. 10-12. Supp. iii. t. 18*.—*Rhenne*, Cuvier, R. A.—*Caribou* or *Carreboeuf*, French Canadians.—*Oleen*, Russians in Siberia.

Var. Smaller ; horns more slender, less palmated ; hair short, smooth, close, brown, with throat and belly white in summer ; hair very close, thick, waved, brittle and erect and white in winter.

Cervus Tarandus Americanus, H. Smith, G. A. K. v. 773.—*C. Tarandus v. Arctica* (*Barren-ground Caribou*), Richardson, Fauna Bor. Amer. 241. fig. 240, horns.—*Common Deer*, Hearne, Journ. 195. 200.

Inhabits Arctic parts of Europe and America.

Varies exceedingly in size. In the British Museum there are specimens varying from 20 to 28 inches high at the withers, and proportionally as large in the horns and all the other parts. The variety is confined to the barren grounds.

Dr. Richardson observes, "There are two well-marked and permanent varieties of *Caribou* that inhabit the fur countries ; one of them (*Woodland Caribou*) confined to the woody and more southern districts, and the other (*Barren-ground Caribou*) retiring to the woods only in the winter, but passing the summer on the coasts of the Arctic seas, or on the barren grounds so often mentioned in this work."—*Fauna Bor. Amer.* 299.

The large Siberian variety are ridden on by the Tungusians. They also use them for draught, as the Laplanders do the smaller variety.

They have a large variety in Newfoundland, nearly as large as a heifer, having very large and heavy horns. There are some horns of this variety in the British Museum. M. Middendorf informed me that the horns of the large Siberian variety were as large as, and greatly resembled, the horns from Newfoundland (Nova Scotia) in the British Museum Collection.

Pallas observes, "Americæ forte continua gregatim verno tempore per glacies migrant, paulo diversi a Siberiæ inquilinis et verosimilime Americani."—*Zool. Ross. Asiat.* i. 208.

No. CCXV.—PROCEEDINGS OF THE ZOOLOGICAL SOCIETY.

B. The DEER OF THE WARM OR TEMPERATE REGIONS have a tapering nose, ending in a naked, moist muffle ; they generally have a well-developed tail, distinct crumen, and rather long false hoofs ; their fawns are spotted, the spots generally disappearing in the adult, or only to be seen when the animals are in high condition ; the fur is shorter and fulvous in the summer, becoming longer and greyer in the winter ; the skulls have a moderate nose-cavity, and the intermaxillaries reaching to or nearly to the nasal bones.

c. The ELAPHINE DEER OR STAGS have a low, broad muffle, narrowed and rounded below, and nearly separated from the edge of the lip by a hairy band, which has only a narrow interruption in the middle, and rather elongated ears ; they have rough horns, generally supported on a more or less long process of the frontal bones, furnished with a frontal basal branch or snag close on the burr or crown ; the outer side of the hind-legs has a tuft of hair placed rather above the middle of the metatarsus, and another tuft on the inner side of the hock.

They are (except the *Wapiti*) exclusively confined to the woods of the Old or Eastern World.

3. CERVUS ; *Elaphus*, H. Smith ; *Cervus* and *Pseudocervus*, Hodgson.

Horns round, erect, with an anterior basal snag, a medial anterior snag, and the apex divided into one or more branches, according to the age of the animal ; a well-developed crumen ; narrow triangular, compressed hoofs ; they are covered with brittle, opaque hairs ; the rump is generally ornamented with a pale mark ; skull with a large, deep, suborbital pit.

* The *True Stags* have one or two branches on the middle of the front of the beam.

† The *American kind* have rather broad semicircular hoofs, a very short tail, and the withers covered with softer hair in winter. *Strongyloceros*.

1. CERVUS CANADENSIS. The WAPITI.

Red-brown ; rump with a very large pale disk extending far above the base of the tail, and with a black streak on each side of it ; male with hair of throat elongated, black, with reddish tips.

Stag, Dale, Phil. Trans. n. 444, 384.—*Cerf de Canada*, Perr. Anim. ii. 55. t. 45?; Cuvier, R. A. i. 256.—*Cervus Canadensis*, Brisson ; Gray, Knows. Menag. 58.—*Cervus Elaphus, var. Canadensis*, Erxl.—*Cervus Strongyloceros*, Schreb. t. 247 ; Richardson, Fauna Bor. Amer. 251.—*C. major*, Ord.—*C. Wapiti*, Leach, Journ. Phys. lxxxv. 66.—*American Elk*, Bewick, Quad.—*North-Western Stag*, *C. occidentalis*, H. Smith, G. A. K. iv. 101. t. . f. 2, horn ; Fischer, Syn. Mamm. 614, not Syn.—*Wapiti*, Warden, États Unis, v. 638 ; Wied, Voy. Amer. Sept. iii. 302.

Var. Smaller.

Red Deer (or *Canadian Stag*), Warden, États Unis, v. 637.—*Elk*, Lewis and Clerk.—*Stag*, Pennant, Arct. Zool. i. 27.—*Wewaskiss*, Hearne, Journ. 360.

Inhabits N. America.

In summer red-brown; ears, middle line of the back of the neck, and back of rump and front of legs blackish; rump-mark yellowish.

†† The species of the *Western World* have narrow, triangular hoofs, a moderate tail, and are covered with harsh hair. *Cervus*.

2. CERVUS ELAPHUS. The STAG.

Brown; rump with a pale spot extending rather above the upper surface of the base of the tail.

Cervus, Plin.; Gesner.—*Tragelaphus*, Gesner (old male).—*Cervus Elaphus*, Linn.; Gray, Knows. Menag. 58.—*C. vulgaris*, Linn.—*C. nobilis*, Klein.—*C. Germanicus*, Brisson.—*C. Elaphus* β . *Hippelaphus*, Fischer, Syn. (old male).—*Stag, or Red Deer*, Pennant.—*Cerf*, Buffon, H. N. vi. t. 9.—*Cerf commun*, Cuvier; F. Cuvier, Mamm. Lith. t. .

Inhabits Europe.

Mr. Blyth described a variety as the *Hungarian Stag* (Mus. Asiat. Soc. Beng. 1841, 750. t. 3. f. 11).

The Deer which Buffon (H. N. vi. 95. t. 11) describes under the name of the *Cerf de Corse*, has been regarded as a variety to be distinguished by the smallness of its size, but Buffon observes, that he believes the "size to depend on the scarcity of nourishment; for when moved to better pastures, in four years they became higher, larger and stouter than the Common Stags."

3. CERVUS BARBARUS. The BARBARY DEER.

Dark brown; obscurely white spotted, with a very indistinct, greenish brown, broad dorsal line, with a pale yellow spot extended considerably above the base of the tail; back of haunches white, with a dark stripe on each side.

Cervus Barbarus, Bennett, MSS. Catal. Gardens Zool. Soc.; Gray, Knows. Menag. 59; Frazer, Zoologia Typica, t. .—*Burk-Goat* (*Al-Wassai*), Moors (see Griffith, A. K. v. 775).

Inhabits Coast of Barbary; Tunis.

4. CERVUS WALLICHII. The BARA SINGA or MORL.

Brown, with a very large white spot on the rump, extending on back of the haunches and far above the base of the tail; the horns with two basal and one or two apical branches.

Cervus Pygargus, Hardw. Linn. Trans.—*Cervus Wallichii*, Cuvier, Oss. Foss. v. 50; F. Cuv. Mam. Lith. from Hardw. Icon.; Sundev. Pecora, 55; H. Smith, G. A. K. iv. 103. t. . (from Indian drawing); Gray, Knows. Menag. 60.—*Jaareel Stag*, Blyth, Journ. Asiat. Soc. Bengal, 1841, 750. t. . f. 7, young horn; Hodgson, Icon. ined. t. 198, called *Gyana*.—*Pseudocervus Wallichii*, Hodgson, Journ.

Asiat. Soc. Bengal, x. 914, xi. 284.—?*Cervus Caspianus* or *Hangool*, Falconer, MSS. ; Gray, Cat. Osteol. Sp. B. M. 147.—?*Cervus Cashmirensis*, Gray, Cat. Osteol. Sp. B. M. 65.—*Kashmir Stag?*, Blyth, P. Z. S. 1840, 72 ; Journ. Asiat. Soc. Bengal, 1841, 750. t. . f. 8, 9.—*Persian Deer*, *Maral* or *Gevezu* or *Gookoohee*, MacNeil, P. Z. S. 1840, 11 ; Blyth, Journ. Asiat. Soc. Bengal, 1841, 750. t. . f. 10. Inhabits Cachir (*Hodgson*) ; Persia (*MacNeil*).

The skull of Dr. Falconer's *Cashmere Stag* is 15 inches long ; the suborbital pit is oblong, triangular, and rather deep. The skull and horns are very like Mr. Hodgson's specimen of *Cervus affinis*, but they are considerably smaller.

Sir John MacNeil informs us they are called by the Persians *Maral*, or *Gevezu*, or *Gookoohee*, and are frequently noticed in their literature. It is found in all the wooded mountain districts of Persia, but apparently does not occur in the central parts of the country. They rarely descend into the plains. During the summer they are found in the highest wooded parts of the mountains, and during the winter in the lower ravines, near their bases, where they are frequently tracked in the snow. The horns of the adult males closely resemble those of the Red Deer of this country; insomuch that I doubt whether an unscientific observer could distinguish them, except by the superior size of those of the *Maral*.—P. Z. S. 1840, 11.

5. CERVUS AFFINIS. The SAUL FOREST STAG.

Pale brown ; rump without any distinct pale mark? ; skull 16 or 17 inches long ; suborbital pit large, oblong, trigonal, rather deep.

Cervus affinis (*Mool Baratingha, or Royal Stag of the Morung*), Hodgson, Icon. ined. B. M. n. 197 ; Journ. Asiat. Soc. Bengal, x. 741, 914 ; Calcutta Journ. N. H. iv. 291 ; Sundev. Pecora, 131 ; Gray, Cat. Ost. Sp. B. M. 65 ; Knowsley Menag. 60.—*C. Elaphus*, Hodgson, Journ. Asiat. Soc. Bengal, iv. 648.—*C. Wallichii*, part, Gray, Cat. Hodgson's Coll. in B. M. 32.—*C. Wallichii*, var. Blyth, Journ. Asiat. Soc. Bengal, 1841, 747.

Inhabits India ; Saul Forest.

Mr. Hodgson, in his figure of this animal, does not represent any pale spot on the rump : if this is correct, it must be a most distinct species, as Dr. Falconer informs me the *Cashmere Stag* has a large white rump.

6. CERVUS SIKA. The SIIKA.

Dark brown ; cheeks and throat rather paler ; rump brown, without any pale spot ; tail pale, white beneath ; hair harsh ; horns rather slender, with a basal and medial snag, and a subapical internal one.

Cervus Sika, Schlegel, Fauna Japon. t. 17 ; Sundev. Pecora, 55, 131 ; Gray, Knows. Menag. 60.—*C. Sitzia*, Temm. Mus. Leyden.

Inhabits Japan. Mus. Leyden.

4. DAMA, H. Smith ; *Platyceros*.

Horns, upper part expanded, smooth, and branched on the hinder edge ; tail rather elongated ; tear-bag well developed ; hoofs narrow,

triangular, compressed ; they are covered with thin, rather adpressed hairs, and have the hair of the nape reversed ; the fur is spotted in summer ; the skull with a short broad face, an oblong, rather shallow, infraorbital pit ; intermaxillary broad, reaching to the short broad nasals.

1. **DAMA VULGARIS. The FALLOW DEER.**

Fulvous ; white spotted, with the longitudinal streak on the lower part of the side, and the line across the haunches white.

Var. From nearly black to nearly pure white.

Platyceros, Plini.—*Cervus platyceros*, Raii Quad. 85.—*Cervus dama*, Linn.—*Dama vulgaris*, Gesner, Quad. 335. f. ; Gray, Cat. Osteol. Sp. B. M. 65 ; Knows. Menag. 60.—*Fallow Deer and Buck*, Pennant.—*Daim et Daime*, Buffon.—*Daim fauve*, F. Cuvier.—*Cervus coronatus*, H. Smith, G. A. K. iv. t. . f. 4, from monstrous horns.

Var. Blackish.

Cervus mauricus, F. Cuv. Bull. Soc. Phil. 1816.—*C. Dama maura*, Fischer.—*Daime noire*, F. Cuv. Mam. Lith.

Inhabits Persia. Domesticated in Europe.

This species is represented in the sculptures from Nineveh.

d. The RUSINE DEER or SAMBOOS have a large moist muffle, which is as high as broad, and extends to the edge of the upper lip ; hind-leg with a large tuft of hair rather above the middle of the metatarsus, and with a pencil of hair on the inner side of the hock ; a moderate tail, broad, short ears, and the fur consisting of hard, rather shining, thick, depressed hair ; they have no white mark on the rump. The horns are cylindrical, generally rather longly peduncled, with a distinct anterior basal branch or snag close on the burr or crown, and are forked, and sometimes reforked, at the tip ; they have no medial snag. The skulls have a large, very deep, suborbital pit. They are confined to South-Eastern Asia and its islands.

* In some the upper part of the horns is variously branched.

5. **PANOLIA, Gray.**

The horns round, curved backwards and outwards, with a large anterior basal snag close on the burr ; the upper part bent in, forked, becoming rather expanded and branched on the inner or hinder edge ; the fur formed of rather rigid, flattened hair ; muffle large ; skull with a narrow face, a large, oblong, very deep suborbital pit, and the nasals short, broad, and dilated behind ; the frontal snag of the horns often has a tubercle or branch at the base.

1. **PANOLIA EEDII. The SUNGNAI.**

Panolia Eedii, Gray, Cat. Hodgson's Coll. B. M. 34 ; Knowsley Menag. 61.—*P. acuticornis*, Gray, Cat. Mam. B. M. 180.—*P. platyceros*, Gray, Cat. Mam. B. M. 180 (adult horn).—*Cervus lyratus*, Schinz, Syn. ii. 395.—? *Cervus Smithii*, Gray, Proc. Zool. Soc. 1837, 45.—*Cervus Eedii*, Calcutta Journ. N. H. ii. 413. t. 12.—*Cervus*

(*Rusa*) *frontalis*, M'Clelland, Calcutta Journ. N. H. i. t. 12. f. 1, ii. 539, iii. t. 13; Sundevall, Pecora, 132.

Inhabits India.

General Hardwicke has a drawing of a Deer, the frontal snag of the horns very much elongated, and apparently forked: Colonel Hamilton Smith made an "improved" drawing from the sketch; and in the Proceedings of the Zoological Society for 1837 I mention the species under the name of *C. Smithii*, p. 48.

I am now doubtful if the sketch might not have been intended for this species or a new one allied to it.

6. RUCERVUS, Hodgson; *Rusa*, sp. H. Smith.

Horns cylindrical, with an anterior basal branch, and repeatedly forked at the tip; muffle large, high, continued to the edge of the upper lip below; they have a rather short, thick tail, a shortish face, a well-developed crumen, broad rounded ears, covered with hair, and narrow compressed hoofs. The fur is formed of rather soft adpressed hairs; they have no pale mark on the rump, and are indistinctly spotted. The skull has an elongate face, with a large nose-opening, and an oblong, rather shallow, suborbital pit.

1. RUCERVUS DUVAUCELLII. The BAHRAIYA.

Yellowish brown, without any rump-spot; back with an indistinct dark streak, with a row of white spots on each side; sides not spotted; hair black, with yellow tips; neck with rather longer hair; throat, chest and belly with longer, scattered, greyish white hairs; muzzle and front of leg dark; chin white. Fur in winter dark brown.

Cervus Duvaucellii, Cuvier, Oss. Foss. iv. t. 29. f. 6, 8.—*Rucervus Duvaucellii*, Gray, Cat. Hodgson's Coll. B. M. 33.—*Rucervus elaphoides*, Hodgson.—*R. Duvaucellii*, Gray, Knows. Menag. 61.—*Cervus Bahrainja*, Hodgson.—*C. enclodocerus*, Hodgson.—*C. Bahrainja*, Hodgson, P. Z. S. 1836, 46.—*C. Euryceros*, Knowsley Menag. t. 40, 41.—*Bahrainja*, Hodgson.

Inhabits India.

* The True *Rusas* have the upper part of the horns simply forked.

7. RUSA, H. Smith; *Cervus Hippelaphi***, Sundevall.

They are covered with hard, rigid, very thick hairs; they are not, or only obscurely, spotted; the horns are placed on a moderately long peduncle, have an anterior frontal snag close on the crown, and are simply forked at the tip.

† The Larger kinds have the hair of the neck elongated, forming a kind of mane, at least in the males.

1. RUSA ARISTOTELIS. The SAMBOO.

Tail not floccose, brown, rather darker at the end; blackish brown, with the feet, the region of the vent, and a spot over the eyes fulvous. Male maned. Young obscurely white spotted (Hodgson).

Gona Rusa, Daniel, Ceylon, t. .—*Cervus Aristotelis*, Cuvier, Oss. Foss. iv. 502. t. 39. f. 10; F. Cuv. Mam. Lith. t. ; Suudev. Pecora, 55.—*Cervus Hippelaphus*, C. Aristotelis, and C. heteroceros, Hodgson, Icon. ined.—*Rusa Aristotelis*, H. Smith; Gray, Cat. Hodgson's Coll. B. M. 67; Osteol. Spec. B. M. 67; Knows. Menag. 62.—*Cervus unicolor*, H. Smith, G. A. K. v. 780.—*Cervus Bengalenesis*, Schinz, Syn. Mam. ii. 390.—*Daim noir de Bengal*, Duvaucell, Asiat. Res. xv. 157.—*Cerf noir de Bengal*, F. Cuvier, Menag. Lith. t. .—*Cervus equinus* (Samboo Deer), Bennett, Tower Menag. 185, fig.—*Elk*, Indian Sportsmen; Sykes, Proc. Zool. Soc.—Var. *Cervus heteroceros*, Hodgson, J. A. S. Beng. 1841, 722. t. .

Var. ? *Biche de Malacca*, F. Cuv. Mam. Lith. t. female.—*Cervus Malaccensis*, Fischer, Syn.

Inhabits India; Ceylon.

The skull is about 17 inches long, and has a very deep, oblong, subtriangular, suborbital pit.

The specimen from Ceylon, in the Zoological Gardens, differs from the common Samboos from India in having shorter and thicker horns.

Nearly black in October; the front of the muzzle rounded, the nose black, forming a band across the chin; front of chin (only) white; tail all black; face paler than back, and more grised, but uniformly coloured, without any black streak over the eyes or up the side of the nose; vent flesh-coloured. Much larger.

2. RUSA DIMORPHE. The SPOTTED RUSA.

Red-brown; back with distinct series of small white spots; sides indistinctly white spotted; limbs paler; neck and belly blackish; chin white; the horns (deformed?). Young bright fawn-red, white spotted.

Cervus Dimorphe, Hodgson, Journ. Asiat. Soc. Bengal, 1844, t. ; Ann. & Mag. Nat. Hist. xiv. 74; Sundevall, Pecora, 132.—*Rusa Dimorpha* (Hodgson's Rusa), Hodgson in Gray, Cat. Hodgson's Coll. in B. M. 33; Gray, Knows. Menag. 62.

Inhabits Saul Forest; Morang.

3. RUSA EQUINUS. The RUSA or SMALLER SAMBOO.

Brown, not spotted; tail rounded, floccose, black at the tip; hair (summer) elongate, rigid, thick, waved. Young very obscurely spotted; hair rigid and rough.

Rusa, Raffles, Linn. Trans. xiii. 263.—*Cervus equinus*, Cuvier, Oss. Foss. iv. 44. t. 5. f. 30, 37, 38, 42; H. Smith, G. A. K. iv. 112. t. ; Sundevall, Pecora, 55; S. Müller, Nederl. Verh.—*Eland* or *Elk* of the Dutch Sportsmen.—*Rusa Equinus*, Gray, Knows. Menag. 62. t. 43.

Inhabits Sumatra; Borneo.

4. RUSA HIPPELAPHUS. The MIJANGAN BANJOE.

Greyish brown; tail not floccose, brownish at the tip; anal region not pale; cheeks and upper part of the neck of the males maned; hair (summer) short, rigid, close-pressed, not waved. Young: hair smooth.

Rusa ubi, *R. saput* and *R. Tunjuc*, Raffles, Linn. Trans. xiii. 260.—*Cervus hippelaphus*, Cuvier, Oss. Foss. iv. t. 5. f. 31, 34 & 42; F. Cuvier, Mam. Lithog. t. ; Raffles, Mem. 645.—*Cervus Tunjuc*, Vigors, in Raffles' Memoir, 645.—*Cervus Rusa*, S. Müller, Nederl. Verh. 45. t. 43.—*Great Muntjac*, Waterhouse, Cat. Mus. Zool. Soc. 1839, 39.—*Cerf noir de Bengal*, F. Cuvier, Mam. Lithog. t. 2, in summer.—*Cervus Leschenaultii*, Cuvier, Oss. Foss. v. , from horns only.—*Rusa Hippelaphus*, Gray, Knows. Menag. 62.

Var. Smaller. Eydoux, Guérin, Mag. Zool. 1836, 26.—*Cervus Moluccensis*, Quoy.—*Cervus Rusa Moluccensis*, S. Müller, Nederl. Verh. t. 45 ; Mus. Leyden, 1845.—*Cervus Rusa Timorensis*, Mus. Leyden, 1845.

Inhabits Java.

In all its states it was very distinct from the Sambo of Continental India. The horns are similar to those of *R. Equinus*, but the body and horns are smaller, and the hair of the young is smoother.

** The Smaller *Rusas* have no mane ; the peduncles of the horns are rather elongated, and covered with hair.

5. RUSA PERONII. The SMALLER RUSA.

Brown, paler beneath ; hair rigid, thick, ringed ; muzzle dark ; tail brown, floccose ; anal disk white ; the hind part of the feet hairy ; the horns are thick and heavy.

Cervus Peronii, Cuvier, Oss. Foss. iv. 46. t. 5. f. 41, 45 ; Sundev. Pecora, 56.—*Rusa Peronii*, Gray, Knows. Menag. 63.—*Cervus Kuhlii*, S. Müller, Nederl. Verh. 45. t. 44 ; Sundev. Pecora, 56.—*Rusa Kuhlii*, Gray, List. Osteol. Spec. B. M. 68.

Inhabits Timor, Luboc, Bavian and Ternate. Specimen in Brit. Mus.

6. RUSA PHILIPPINUS. PHILIPPINE RUSA.

Forehead brown ; end of nose and eyebrows brownish ; feet behind naked ; hair rigid, not waved.

Cerf de Philippine, Desm. Mamm. 442.—*Cervus Philippinus*, H. Smith, G. A. K. iv. 147. t. 164. f. 5. head, v. 803 ; Fischer, Syn. 622 ; Sundev. Pecora, 56.—*Rusa Philippinus*, Gray, Knows. Menag. 63.

Var.? Tail black, dependent ; front of face dark.

Cervus Marianus, Cuvier, Oss. Foss. iv. 45. t. 5. f. 30, 37, 38, 46 ; H. Smith, G. A. K. iv. 115. t. 168 (from Mus. Paris) ; Fischer, Syn. 453 ; Sundev. Pecora, 57.

Inhabits Philippines.

This species has the horn on an elongated peduncle, like the *Muntjac*, but it is easily distinguished from them by the absence of the ridge and of the grooves on the face.

7. RUSA LEPIDA. The LITTLE RUSA.

“ Reddish brown ; back and sides varied with pale, spotted hair ; vent disk small, white, black edged above ; tail longly hairy, white, above black ; face brown, with a roundish white spot in front of the

usual oval black spot ; horns smooth, slender, nearly straight, elongate, the basal snag bent down on the forehead."—*Sundevall*.

Cervus (Hippelaphus) lepida, Sundev. Pecora, 57.—*Rusa lepida*, Gray, Knows. Menag. 63.

Inhabits Java. Mus. Frankfort. Scarcely as large as a Roebuck.

8. **AXIS**, H. Smith ; *Hippelaphus* ***, Sundev.

Covered with moderately thick, polished hairs ; fulvous and beautifully white spotted at all seasons ; the face is elongate, narrow, and the ears large, rather elongate and acute, with a rather elongate tail, and nearly equally long, slender legs ; the horns are placed on moderately long peduncles ; the skull is elongate, narrow, with an oblong, rather small, deep suborbital pit.

1. **AXIS MACULATA**. The **AXIS** or **CHILTRA**.

Fulvous, with a black dorsal streak, edged with a series of white spots ; sides with many white spots in an oblique curved line, and with a short white streak obliquely across the haunches.

Young fawn, spotted exactly like the adult.

Axis, Plin. ?; Buffon, H. N. xi. t. 38, 39; Cuvier, Menag. Mus. t. ; Oss. Foss. iv. 38. t. 5. f. 24, 29.—*Cervus Axis*, Erxl.; Schreb. t. 250; Bennett, Gard. Zool. Soc. 253; Sundev. Pecora, 57.—*Axis maculata*, Gray, Cat. Mamm. B. M. 178.—*A. major*, Hodgson, Journ. Asiatic Soc. Bengal, x. 914.—*A. minor*, Hodgson, Journ. Asiatic Soc. Bengal, x. 914.—*A. medius*, Hodgson, Icon. ined.—*Cervus pseudaxis*, Gervais, Voy. Bonite, 64. t. 12; Institute, 1841, 419; Sundev. Pecora, 57.—*C. Axis Ceylonensis*, H. Smith.

Var. Blackish. *Cervus nudipalpebra*, Ogilby, P. Z. S. 1831, 136; Sundev. Pecora, 57. 131.

Inhabits India.

The horns of this species vary greatly in size. Pennant describes two Deer under the names of 1. *Greater Axis*, Pennant, Syn. 52; Quad. 106= *Cervus Axis* γ , Gmelin ; 2. *Middle-sized Axis*, Pennant, Quad. 106= *Cervus Axis* β , Gmelin, from the horns alone : these are probably only large-horned examples of the common species ; 3. *C. pseudaxis*, which has been regarded as a species of *Rusa*, is only a small-horned variety.

9. **HYELAPHUS**, Sundev. ; *Axis*, sp. H. Smith.

Covered with moderately thick, polished hair ; fulvous, and spotted in the summer ; with a rather elongated tail, and rather short legs, the front being rather the shortest ; the face is short, broad, and arched in front ; the ears short and rounded ; the horns are placed on moderately long peduncles.

1. **HYELAPHUS PORCINUS**. The **LUGNA PARA** or **SHGORIAH**.

Brown or yellowish brown, with an indistinct darker dorsal streak, and with obscure whitish spots, but without any white streak on the sides or haunches ; in the winter brown and spotless ; front of face

and legs darker; line down the front and the inside of the thighs white.

Porcine Deer, Pennant, Syn. 42. t. 8. f. 2.—*Cerf Cochon*, Buffon, Supp. iii. 122. t. 18 (in summer).—*Cervus porcinus*, Zimmerm.; Schreb. t. 251; F. Cuvier, Mamm. Lithog. t. .—*Hyelaphus porcinus*, Sundev. Pecora, 58; Gray, Knows. Menag. 64. t. 42; Cat. Ost. B. M. 67.—*Axis porcinus*, Hodgson, Journ. Asiat. Soc. Bengal, x. 914; Gray, Cat. Hodgson's Coll. B. M. 33.—*Cervus niger*, Hamilton, Icon. ined.; Blainv. Bull. Soc. Philom. 1816, 76; Fischer, Syn. 454; Sundev. Pecora, 60. 132.

Inhabits India.

Easily known from the *Axis*, by being lower on its legs, and there is no distinct black dorsal streak, nor white streak on haunches; the tail bushy, and often carried erect: the males and females in summer are reddish brown, with numerous white spots, the middle of the back rather darker; in winter the whole fur becomes blackish brown, and the spots disappear: the horns are generally short, with only short snags or branches, but they are sometimes as large as those of the *Axis Deer*.

10. **CERVULUS**, Blainv. 1816; *Muntjacus*, Gray, 1821; *Stylocerus*, H. Smith; *Prox*, Ogilby, Sundev.

Horns on elongated pedicels, supported by longitudinal ridges on the face, which have a naked, moist groove on their side; the canine teeth are exserted; the tear-bags are large and deep; the tail elongate and tufted; the hoofs triangular, and partly united in front by a web; the false hoofs are small and transverse; they are covered with thin shining hair, and are not spotted; they have no tuft of hair on the hind-legs; skull with a very large, deep, nearly hemispherical suborbital pit.

1. **CERVULUS VAGINALIS**. The KIJANG or MUNTJAC.

Dark reddish brown; narrow streak on the front edge of the thigh white.

Kijang, Marsden, Sumatra, 94.—*Cervus Muntjac*, Zimm. Schreb. t. 254; Horsfield, Java, vi. t. 1; Raffles, Mem. 645.—*Prox Muntjac*, Sundev. Pecora, 61.—*Cervus vaginalis*, Bodd. Elenc. i. 136.—*C. subcornutus*, Blainv. Schreb. t. 254 b. f. 2.—*Muntjacus vaginalis*, Gray, Cat. Mamm. B. M. 173.—*Cervus aureus*, H. Smith, G. A. K. iv. 148. t. . v. 805.—*Ribbed-face Deer*, Penn.—*Chevreuil des Indes*, Allam, Buff. Supp. v. 41. t. 17, vi. 195. t. 26; Cuvier, Oss. Foss. iv. t. 5. f. 48, t. 3. f. 49, 54.—*Cervulus vaginalis*, Gray, Knows. Menag. 65.

Inhabits Sumatra; Java.

This chiefly differs from the following in being darker-coloured.

2. **CERVULUS MOSCHATUS**. The KEGAN or KAKER.

Bright reddish yellow; streak on front of thigh and under part of the tail white; chin and gullet whitish; hair not ringed.

Var. With a triangular white spot on each side of the chest.

Musk Deer of Nepal, Ouseley, Orient. Collect. ii. t. .—*Cervulus*

moschatus, Blainv. Bull. Soc. Phil. 1816, 77; Schreb. t. 254 b. f. 1; H. Smith, G. A. K. iv. 149. t. . v. 806.—*Cervus moschus*, Desm. Mamm. 441.—*C. Ratwa*, Hodgson, Journ. Asiat. Soc. Bengal, i. 146. t. head; P. Z. S. 1834, 99; Royle, Flora Cashm. t. 5. f. 2.—*Stylocerus Ratwah*, Hodgson, Journ. Asiat. Soc. Bengal, x. 914.—*Muntjac vaginalis*, part, Gray, Cat. Hodgson's Coll. B. M. 31.—*Prox Ratwa*, Sundev. Pecora, 62.—*P. albipes*, Wagner, Suppl.; Sundev. Pecora, 62.—*P. stylocerus*, Wagner, Suppl.; Sundev. Pecora, 62, 64.—*Cervus melas*, Ogilby.—*Prox melas*, Sundev. Pecora, 62.—*Cervulus moschatus*, Gray, Knows. Menag. 65.

Inhabits India, Nepal.

3. CERVULUS REEVESII. The CHINESE MUNTJAC.

Greyish brown; hair short, paler ringed.

Cervus Reevesii, Ogilby, P. Z. S. 1838, 105.—*Prox Reevesii*, Wagner, Sundev. Pecora, 62.—*Cervulus Reevesii*, Gray, Knows. Men. 65.

Inhabits China.

Mr. Ogilby observes, this species has a longer head and tail than the Common Indian Muntjac, also less red and more blue in the general shades of colouring, and is readily distinguished by the want of the white over the hoofs, which is so apparent in its congeners. The fawn is spotted.

The Earl of Derby has these three kinds at Knowsley; but they breed together, and it has hence become impossible to discriminate the mules from the original species.

e. The CAPREOLINE DEER or ROES have rugose, very shortly peduncled horns, without any basal snag or branch; the first branch arising some distance above the crown or burr; the upper part is more or less branched; the muffle is broad and naked; the suborbital gland and the pit in the skull are very small and shallow, except in *C. Pudu*. Some species have a distinct tuft of hair on the outer side of the metatarsus, and more have the pencil of hair on the inner side of the hock, and others are without either; indeed in some specimens of the same species the tuft of hair on the hinder legs is very visible, in others very indistinctly or not at all seen.

11. CAPREOLUS, H. Smith; *Capraea*, Ogilby.

Horns nearly erect, small, cylindrical, slightly branched, with a very short peduncle; they have no tail, but a large, white anal disk, a very indistinct tear-bag, and narrow triangular hoofs; the tuft on the hind-legs rather above the middle of the metatarsus; they are covered with thick brittle hair in winter, and thinner and more flexible hair in the summer; the adults are not spotted, and have a black spot at the angle of the mouth; the skull has a very small, shallow suborbital pit. Found in Europe and North Asia.

1. CAPREOLUS CAPRAEA. The ROEBUCK.

Inside of the ears fulvous; summer, red brown; winter, olive, pale punctated; horns short.

Capraea, Plin.; Gesner.—*Capreolus*, Brisson.—*Cervus capreolus*,

Linn.; Pallas, Zool. Ross. A. i. 219.—*Capreolus Capraea*, Gray, Cat. Osteol. B. M. 64.—*Capreolus Europeus*, Sundev. Pecora, 61.—*Roe Buck*, Penn.—*Chevreuil* and *Chevrette*, Buffon, H. N. vi. 198.

Inhabits Europe. A larger variety is said to have formerly inhabited the Tyrol.

2. CAPREOLUS PYGARGUS. The AHU.

Interior of the ears fulvous; fur pale yellowish; horns elongate.

Cervus pygargus, Pallas, Reise, i. 97, 198, 433. ii. 159; Spie. xii. 7 (not Hardwicke); Schreb. Saugth. v. t. 253.—*C. capreolus* β , Pallas, Zool. Ross. Asiat. i. 219.—*Cervus Ahu*, Gmelin, Reis. iii. 496. t. 56; Griffith, A. K. iv. 122. t. 1.—*Capreolus pygargus*, Sundev. Pecora, 61.—*Tailless Deer*, Pennant, Quad. i. 121.—*Tailless Roe*, Shaw.

Inhabits Central Asia. Collection of the British Museum.

12. FURCIFER, part. Wagner, Sundev.; *Mazama*, part. Gray, H. Smith; *Hippocamelus*, Leuckart, 1816; *Cervequus*, Lesson; *Capreolus*? Gray.

Horns erect, forked, without any basal snag; ears narrow, acute; a short tail; covered with thick, brittle, waved hairs; there is a distinct pencil of hairs on the inside of the hock, but none on the outer sides of the metatarsus. Confined to South America. Differs from *Capreolus* in the want of the outer tuft on the leg.

1. FURCIFER ANTISIENSIS. The TARUSH or TARUGA.

Yellow grey; hairs rigid, quilled, brown, with a yellow subterminal ring; edge of muffle and throat white; face with a brown longitudinal streak, and a lyrate band between the eyes; the hoofs rather broad, worn in front.

Cervus Antisiensis, D'Orbigny, Voy. Amer. Merid. t. f.; Dict. Univ. H. N. iii. 328; Tschudi, Faun. Peru, t. 18; Sundev. Pecora, 60.

Inhabits East coast of S. America; Bolivian Alps.

2. FURCIFER HUAMEL. The GEMUL.

Fur dark, closely yellow punctated; inside of the ears white.

Equus bisulcus, Molina, Chili, 520; Fischer, Syn. Mamm. 430.—*Auchenia Huamel*, H. Smith, G. A. K. v. 764.—*Cervus Chilensis*, Gay et Gervais, Ann. Sci. Nat. 1846, 91.—*Cloven-footed Horse*, Shaw, Zool. ii. 441.—*Guemul*, Chilians.—*Gemuel* seu *Huemul*, Vidaure, Chili, iv. 87.—*Camelus equinus*, Triverianus, Mus. Biol. ii. 179.—*Hippocamelus dubius*, Leuckart de Equo bisulco, 24. 1816.—*Cervequus andicus*, Lesson, Nov. Tab. R. A. 173.—*Cervus (Capreolus) leucotis*, Gray, P. Z. S. 1849, 64. t. 12.—*Capreolus*? *Huamel*, Gray, Knows. Menag. 66.

Inhabits mountains on East coast of South America. Patagonia.

The female Gemul in the British Museum and in Lord Derby's Museum at Knowsley is considerably larger, and has the legs thicker, than the Siberian *Ahu*, which is much larger than the European Roe Buck.

MM. Gay and Gervais, who have compared the two species, consider them distinct.

13. **BLASTOCERUS**, Wagner, Sundev.; *Mazama*, sp. H. Smith; *Furcifer*, part. Wagner and Sundevall.

Horns straight, erect, three-branched, without any basal snag; a very short tail, and rather large ears; are covered with very thin soft hair; they have a distinct pencil of hairs on the inside of the hock, but none on the outside of the metatarsus. Confined to Tropical America, east and west coasts.

1. **BLASTOCERUS PALUDOSUS**. The GUAZU-PUCO.

Fulvous; orbit, sides of muzzle, belly and under side of tail white; face-marks and feet blackish.

Cervus paludosus, Desm. Mamm. 443; H. Smith, iv. 134. t. v. 796; Fischer, Syn. 444, 616; Licht. Darst. t. 17; Sundev. Peccora, 59.—*C. palustris*, Desmoul. Dict. Class. H. N. iii. 379.—*Cervus dichotomus (Guatzupucu)*, Illiger, Abhand. Akad. d. W. 1804—1811, 117; Pr. Max. Neuw. Isis, 1821, 650. t. 6.—*Blastocerus paludosus*, Gray, Knows. Menag. 68.

Var.? *Mazama furcata*, Gray, Cat. Osteol. B. M. 64.

Inhabits the Brazils.

2. **BLASTOCERUS CAMPESTRIS**. The MAZAME or GUAZUTI.

Fulvous brown; the hairs of the lower part of the nape and front of the back reversed; the hoofs narrow. Young: middle of back not spotted; sides with small white spots, the upper series forming a regular line.

Mazame, Hernandez, Mex.; Buffon, H. N. xii. 317.—*Veado branco*, *Veado campo*, Anchieta, Notic. i. 127.—*Cervus bezoarticus*, Linn. S. N. ed. 10. 67.—*C. campestris*, F. Cuvier, Dict. Sci. Nat. vii. 484?; Cuvier, Oss. Foss. iv. 51. t. 3. f. 46, 47.—*C. campestris*, Licht. Darst. t. 19; Pr. Max. Abbild. t. . . Darwin, Zool. Beagle, 29. fig. horns; H. Smith, G. A. K. iv. 136. t. . v. 797.—*C. leucogaster*, Goldfuss, Schreb. Saugth. 1127.—*Mazama campestris*, H. Smith; Gray, Cat. Osteol. B. M. 64.—*Biche de Savanne*, Buffon, Supp. iii. 126.—*Gouazouti*, Azara, Essai, i. 77.—*Furcifer campestris*, Gray, Knows. Menag. 68.

Inhabits S. America; N. Patagonia. Collection of British Museum.

The figure of *C. campestris* in F. Cuvier, Mamm. Lithog., is evidently a *Cariacus*, and not of this genus. The horns from Brazils figured by Cuvier (Oss. Foss. iv. t. 3. f. 48) appear to belong to quite a different species. It may be the variety of the Roebuck, figured in Griffith, A. K. iv. t. 164. f. 6.

14. **CARIACUS**, Gray; *Mazama*, Sundev.; *Mazama*, part. H. Smith.

Horns cylindrical, arched, with a central, internal snag, the tip bent forwards, and with the lower branches on the hinder edge; they are covered with soft thin hair, have a moderate tail furnished with long hair on the under side, a white anal disk, rather elongated, large, rounded ears; they generally have a tuft of white hair on the outer side of the hind-leg, rather below the middle of the metacarpus,

but it is sometimes not to be seen ; the skull has a very small, shallow, suborbital pit, and the nasal bone is broad and subtriangular behind ; the tail is elongate, slender, pale, with the lower part dark, and reaching nearly to the hocks in summer ; much shorter and broader, and all dark olive in the winter. Confined to North America.

* *Hoofs narrow, elongate ; tail hairy beneath.*

1. **CARIACUS VIRGINIANUS.** The AMERICAN DEER.

Bright fulvous in summer, greyer in winter ; tail fulvous above, the tip black, beneath white ; carried erect when running ; nose brown ; side of mouth white, with an oblique black band from the nostrils ; hoofs narrow, elongate.

Dama Virginiana, Raii Syn. 86.—*Fallow Deer*, Lawson, Carol. 23 ; Catesby, Carol. App. 28.—*Cervus Dama Americanus*, Erxl. Syst. 312.—*Cervus Mexicanus*, Licht. Darstell. t. 20.—*Cervus Strongyloceros*, part, Schreb. Saugth. 1074, not figure.—*Cervus campestris* (*Mazame*), F. Cuv. Mam. Lithog. t. .—*Cervus Virginianus*, Gmelin, S. N. i. 179 ; Desm. Mamm. 442 ; F. Cuvier, Mam. Lithog. t. 205.—*C. Mangivorus*, Schrank, Ann. Wetter. i. 327, 1819, from Buffon.—*C. (Mazama) Virginiana*, Bennett, Gard. Z. S. 205 ; Fischer, Syn. 449 ; Peale, U. S. Explor. Exped. 39 ; Sundeval, Pecora, 58.—*Cervus leucurus*, *Long-tailed Deer*, Douglas, Zool. Journ. xv. 330 ; Richardson, Faun. Bor. Amer. i. 258.—*C. Mazama leucurus*, Sundeval, Pecora, 59.—*Cariacus Virginianus*, *C. leucurus*, and *C. Mexicanus*, Gray, Cat. Osteol. B. M. 63, 64.—*Virginian Deer*, Penn. Syn. 51. t. 9. f. 2 ; Quad. i. 104. t. 11. f. 1.—*Cerf de La Louisiane*, Cuvier, R. A. i. 256 ; Oss. Foss. iv. 33. t. 5. f. 1—5.—*Chevreuil*, Charlev. Nouv. Fran. iii. 152.—*Cariacou*, Buffon, H. N. xiii. 347. t. 44.—*Cariacus Virginianus*, Gray, Knows. Menag. 66. t. 46, winter coat.

Inhabits N. America.

Mr. Peale observes,—“ We believe that the same species of Deer inhabits all the timbered or partially timbered country between the Coast of the Atlantic and Pacific Oceans. They vary in size, as all the animals of this genus do, in different feeding-grounds, but they are specifically the same.” The Mexican Deer (Penn. Syn. 54. t. 9. f. 3, and Quad. i. 20), *Cervus Mexicanus* (Gmelin, S. N. i. 179 ; H. Smith, G. A. K. v. 729, iv. 130. t. . ; Cuvier, Oss. Foss. iv. t. 5. f. 23), *Cervus ramosicornis* (Blainville), are all described from horns, which only appear to be much-developed horns of this species which have belonged to some well-fed animals.

The horns described and figured as *C. clavatus* (H. Smith, G. A. K. iv. 132. t. .), appear to be only varieties of the common form.

1. The *Cervus Mexicanus* (Lichten. Darst. t. 20 ; Sundeval, Pecora, 59),
2. The *Cervus nemoralis* (H. Smith, G. A. K. iv. 157. t. . ; Sundeval, Pecora, 59),
3. The *Cervus gymnotis* (Wiegmann, Isis, 1833 ; Sundeval, Pecora, 59),

all from Mexico, appear to be varieties of this species. *C. Mexicanus*





is said to have a brown tail and indistinct chin-band. The nakedness of the ears, which is peculiar to *C. gymnotis*, is often to be observed in these animals when in change of fur. *C. spinosus*, Gay and Gervais, is only known from a single horn from Cayenne.

2. CARIACUS LEWISII. The BLACK-TAILED DEER.

The tail black above towards the extremity, yellowish white beneath, covered with hair at all seasons, not carried erect when running; fulvous (in summer); hair very soft, not ringed; forehead and upper part of face before the eyes blackish; inside of the legs and belly white; chin-band distinct, black; front hoofs narrow, elongate. Horns like *C. Virginianus*, but generally more slender, and commonly without the first antler.

Black-tailed Deer, Anglo-American in Oregon.—*Black-tailed Fallow Deer*, Lewis and Clerk, Travels to the Pacific, ii. 26, 125 (London edit. 1807).—*Cervus macrotis* β . *Colombiana*, Richardson, Fauna Bor. Amer. i. 257.—*Long-tailed Deer* (*Cervus macrourus*), H. Smith, G. A. K. iv. 134, v. 795, part; Fischer, Syn. 615.—*Cervus Lewisii*, J. Peale, U. S. Explor. Exped. 39. t. 9, ined. fig. at p. 43, fore-foot; Gray, Knows. Menag. 67, t. 44, in summer, t. 45, in winter fur.

Inhabits N.W. Coast of N. America.

3. CARIACUS PUNCTULATUS. The CALIFORNIAN ROE.

(Mammalia, Pl. XXVIII.)

Dark reddish brown (in summer), minutely punctulated by the yellow tips of the hair; chin-mark distinct; ears elongated, nakedish; base of the ears, orbits, round the muzzle, under side of tail, and the upper part of the inside of the leg, white; forehead, line down the face, and narrow streak on upper part of the nape black; legs brown; a very narrow, indistinct streak on the middle line of the rump yellowish; tail like back, with a blackish tip.

Inhabits California.

There is a female of this species in the Zoological Gardens. It is much smaller than the Black-tailed Deer, and darker than *C. Virginianus*, and it differs in the hair being dark, with a distinct yellow sub-terminal band.

** *The front hoof broad cordate; tail not hairy beneath.*

4. CARIACUS MACROTIS. The MULE DEER.

Brownish fulvous; chin without any or only an indistinct band; tail pale ferruginous, with a black tuft at the end, and without any hair beneath; ears very large; hoofs of the fore-feet broad cordate, nearly as broad as long, flattened and concave beneath; horns larger and more spreading than in *C. Virginianus*.

Mule Deer, Anglo-Americans of the Rocky Mountains.—? *Mule or Black-tailed Deer*, Le Raye; Lewis and Clerk, Travels; Wied, Voy. Amer. Merid. iii. 273, and Vig. A, B.—*Cervus macrotis*, Say, Long, Exped. Rocky Mount. ii. 88; H. Smith, G. A. K. v. 794; Fischer,

Syn. 444, 615 ; Sundeval, Pecora, 59 ; Richardson, Faun. Bor. Amer. 254. t. 20 ; Peale, U. S. Expl. Exped. 41. t. 10 (ined.), fig. at p. 43, fore-feet ; Gray, Knows. Menag. 67.—*C. auritus*, Desm. Dict. Class. H. N. iii. 379.

Inhabits N.W. America ; Arakansa.

We have several skulls of this genus in the British Museum, which offer very distinct characters, but unfortunately, not having the skins belonging to them, we cannot identify with certainty the species to which they belong.

These skulls vary considerably in width and comparative length of the face, and in the extent and depth of the suborbital pit ; in some, which are probably the skulls of the *Black-tailed Deer* as they come from the north-west coast, the pit is very large and deep ; and thirdly, in the extent of the intermaxillary lines. In some they scarcely reach to the nasal ; in others they reach to it and are united to it by a rather broad suture ; and in others they do not nearly reach to it, but stop abruptly, ending in a notch in the front upper edge of the maxillary.

There is imported by the North Western American Fur Company the flat skin of two Deer which probably belong to this genus, and appear distinct from the preceding : 1. The *Orenoka Deer* (of the Company's list). It came from Central America, is of a large size, of a bright red-brown colour, with the hair of the back short and rather adpressed, the chin and under part of the body white, the tail blackish ; 2. The *Yucatan Deer*, about the size of the *American Deer* (*C. Virginianus*), but very distinct from the skin of that species in the same store ; the fur is short red brown with blackish tips.

15. COASSUS, Gray ; *Subulo*, H. Smith, Sundeval.

Horns simple, rudimentary, shelving back ; ears rather short, broad, rounded ; tail short ; the facial line rather convex ; the fur short, of the forehead (in both sexes) elongate, forming a rhombic tuft between the horns and face ; legs without any tuft on the outside of the metatarsus, but with a pencil on the inside of the hocks. Confined to Tropical or South America.

* *Ears nakedish ; skull with a very small, shallow, suborbital pit ; supraorbital foramen in a groove.* East coast of America.
Coassus.

1. COASSUS NEMORIVAGUS. The CUGUACU-APARA.

(Mammalia, Pl. XXII. XXIII. XXVII. f. 1, 3, 5.)

Pale brown ; the hair dull-coloured, brown, with a yellow subterminal band which wears off ; a paler streak over the eyes. Young : brown, white spotted ; spots of sides unequal ; nape dark. Skull elongate, suborbital pit broad, subtrigonal shallow ; grinders moderate, infraorbital ridge very distinct, sharp-edged. The intermaxillaries do not reach to the nasal but fit into a notch in the maxilla.

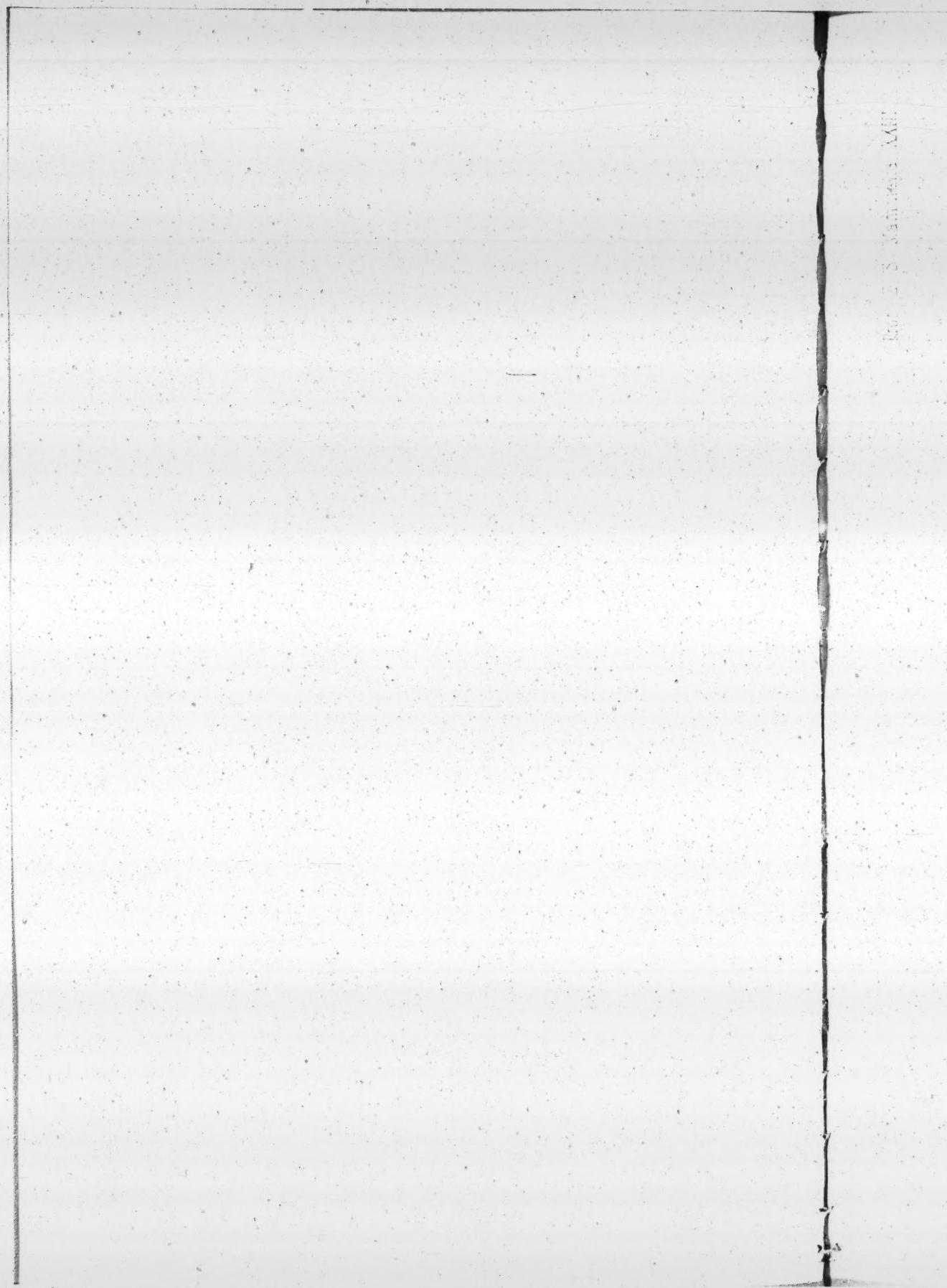
Cervus nemorivagus, F. Cuvier, Dict. Sci. Nat. vii. 485 ; Cuvier, Oss. Foss. iv. 54. t. 5. f. 50 ; Fischer, Syn. 446, 618 ; H. Smith, G. A. K. iv. 142. t. ; Sundev. Pecora, 60 ; Licht. Darstel. t. 21.—



M. & N. Hanhart, Imp^t

J. Wolf, Lath.

COASSUS NEMORIVAGUS, &





Hannatt. 1908

J. Wetten

CYASSUS NEMURIVAGUS, ♀

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M. & N. Hanhart Imp'

J. Wolf Lith

SC. O. A. S. S. S. S. R. U. F. U. S.

Coassus nemorivagus, Gray, Cat. Osteol. B. M. 64; Knows. Menag. 68. t. 48.—*Cervus nemorum*, Desm. Mam. 446.—*C. simplicicornis*, Illiger, Pr. Max. Abbild. t. .—Young? *Moschus delicatula*, Shaw, Mus. Lever. t. 36.

Inhabits Brazils.

A male specimen at Knowsley Menagerie, drawn by Mr. Wolf in Nov. 1850 (Pl. XXII.), was dark brown; streak on each side of the forehead, upper part of the legs and spot on the angles of the lower lip blackish; streak over each eye yellowish; under lip and spot on upper lip near muffle, underside of the tail and inner side of the upper part of the thighs white; muffle smooth, bluish, upper edge slightly arched; ears small, lower half of the inner side black.

This male was the size of a full-grown Roebuck, as is the largest of the genus in the Menagerie.

There is a female at Knowsley (Pl. XXIII. and XXVII. f. 3), drawn by Mr. Wolf in November 1850, which is probably a young female of this species. Mr. Fraser thus described it: "A female: dark grey, tinged with brown, greyer on the head and neck; the lower part, and the inside of legs, the belly and round the eyes rust-coloured; the purple brown patch in the ears smaller and less distinct than *C. rufus*. A small white stripe in front of the eyes and the under surface of the tail white; from the eyes to the nose short and thick compared with the other specimens."

2. COASSUS RUFUS. The CUGUACU-ETE or PITA.

(Mammalia, Pl. XXIV. XXVII. f. 2.)

The fur bright shining red; crown and neck grey; sides of face and chest paler. Young: reddish, white spotted, spots of side unequal; nape with a distinct white-edged dark central streak; the muffle carunculated, rather angularly produced above.

Var. With white rings above the hoofs.

Cervus rufus, F. Cuvier, Dict. Sci. Nat. vii. 485; Cuvier, Oss. Foss. iv. 53. t. 3. f. 41, 42, t. 5. f. 44; H. Smith, G. A. K. iv. 140. t. ; Pr. Max. Abbild. t. ; Fischer, Syn. 446, 618; Licht. Darst. t. 20; Sundeval, Pecora, 60.—*Cervus simplicicornis* (*Apara* β.), H. Smith, G. A. K. iv. 141. t. .—*C. dolichurus*, Wagner, Supp. iv. 389.—*Cariacou de la Guyane*, Buffon, ix. 90.—*Biche rouge*, Buffon, Supp. iii. 126.—*Gouazou pita*, Azara.—*Coassus rufus*, Gray, Knows. Men. 69. t. 47.

Inhabits S. America.

The males cast their horns in the month of September, and they are very shortly replaced by a new pair.

Mr. Fraser has kindly sent me the following description of the female at Knowsley, figured by Mr. Wolf in November 1850 (Pl. XXIV.): "A female: light red brown, neck and head greyer; darker grey on the hocks and upper part of the fore legs; the forehead with one black stripe on each side a grey one in the centre, which leaves two brown yellow stripes on each side; ears with a purplish brown patch of about a third of the whole extent inside; the muffle is carunculated as figured Pl. XXVII. f. 2, of a purplish hue."

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3. COASSUS SUPERCILIARIS. The EYEBROWED BROCKET.

(Mammalia, Pl. XXV. XXVII. f. 4.)

Bright shining red ; neck and head grey ; forehead darker ; hocks and front of the fore legs grey ; stripe in front of the eye and under-surface of the tail white ; muffle deeply arched above ; ears moderate.

Coassus superciliaris, Gray, Gleanings Knows. Menag. t. 48.

Inhabits the Brazils. Para.

This species chiefly differs from the former in the form of the muffle and in the presence of the white streak over the eyes. There is a male at Knowsley, and formerly there was a female in the Gardens of the Society.

4. COASSUS AURITUS. LARGE-EARED BROCKET.

(Mammalia, Pl. XXVI. XXVII. f. 6.)

Bright pale red brown ; head and neck grey ; orbits pale brownish ; spot on side of upper lip, chin, belly, hinder side of fore and front side of hinder thighs and under side of tail, white ; crown dark grey brown ; ears very large, broad, acute, more than half the length of the head, with two lines of hairs in them.

Inhabits the Brazils.

There is a female of this species in the Gardens of the Society ; it greatly resembles the Indian *Muntjac* in the distribution of its colour.

In the British Museum there are two skulls which belong to these species. They have the face shorter and thicker than the skull of *C. nemorivagus*, the nasals are wider behind ; the suborbital pit small or less impressed, and the grinder larger.

The first belongs to a young specimen in the Museum Collection, apparently of *C. rufus*. It has a small slightly impressed pit just in front of the edge of the orbit. The second belongs to a more adult female, sent, without the skin, from Para by Mr. Reginald Graham ; it is considerably larger than the preceding, and there is scarcely any visible impression in front of the orbit, only a slight concavity of the general surface. This skull exactly resembles that of *C. superciliaris*, which was in the Zoological Society's Gardens.

** *Ears thickly covered with short hairs ; skull with a very deep oblong suborbital pit ; face short ; grinders large.* West coast of America. *Pudu*.

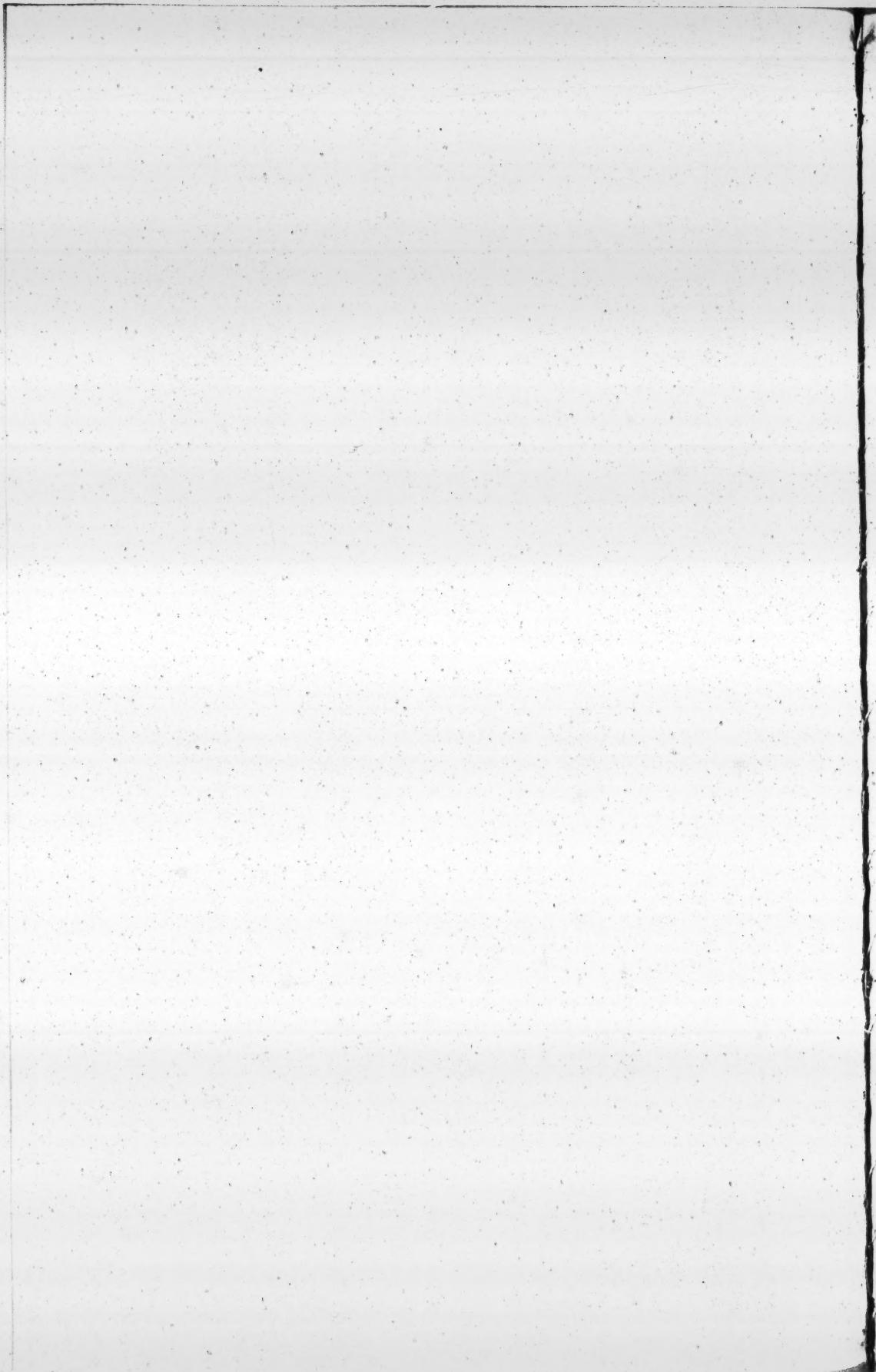
5. COASSUS PUDU. The VENADA.

Fur rufous, blackish in front and darker behind, and on the forehead and lower part of the leg ; hairs ringed, of cheeks and neck greyish, of forehead and ears bright rufous ; ears short ; tail very short.

Cervus huunilis, Bennett, P. Z. S. 1831, 27. fem. ; Sundev. Pecora, 60.—*C. rufus*, Wagner, Supp. iv.—*Capra Pudu*, Molina.—*Chevreuil*, Poeppig, Frotiep's Notiz. 1829 ; Féruccac, Bull. Sci. xix. 95.—*Cervus Pudu*, Gervais, Ann. Sci. Nat. 1846, 90.—*Antilope (Mazama) Temmamazama*, H. Smith, G. A. K. iv. 291 ?

Inhabits Chili ; Conception and Chiloe (King). Brit. Museum.

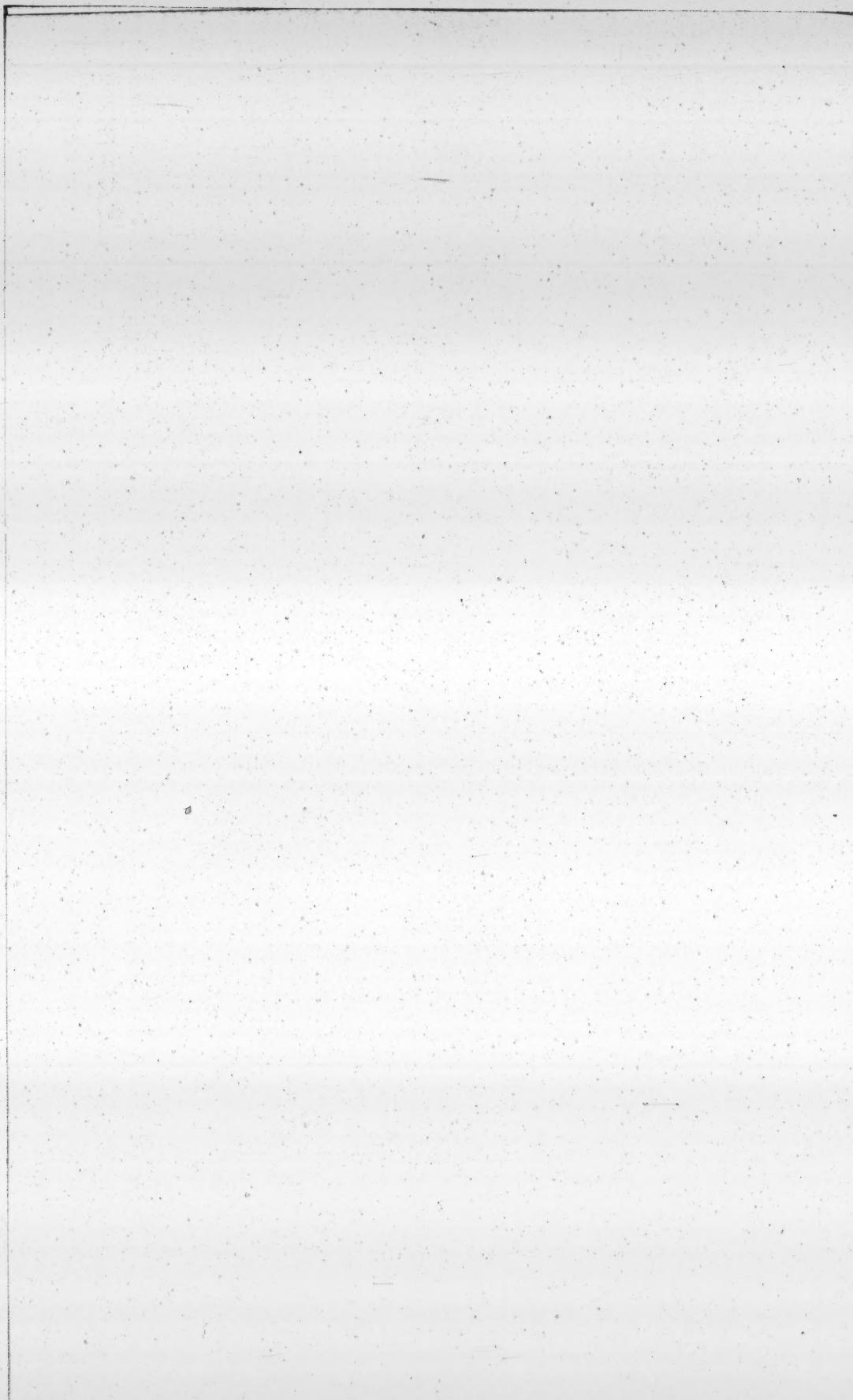


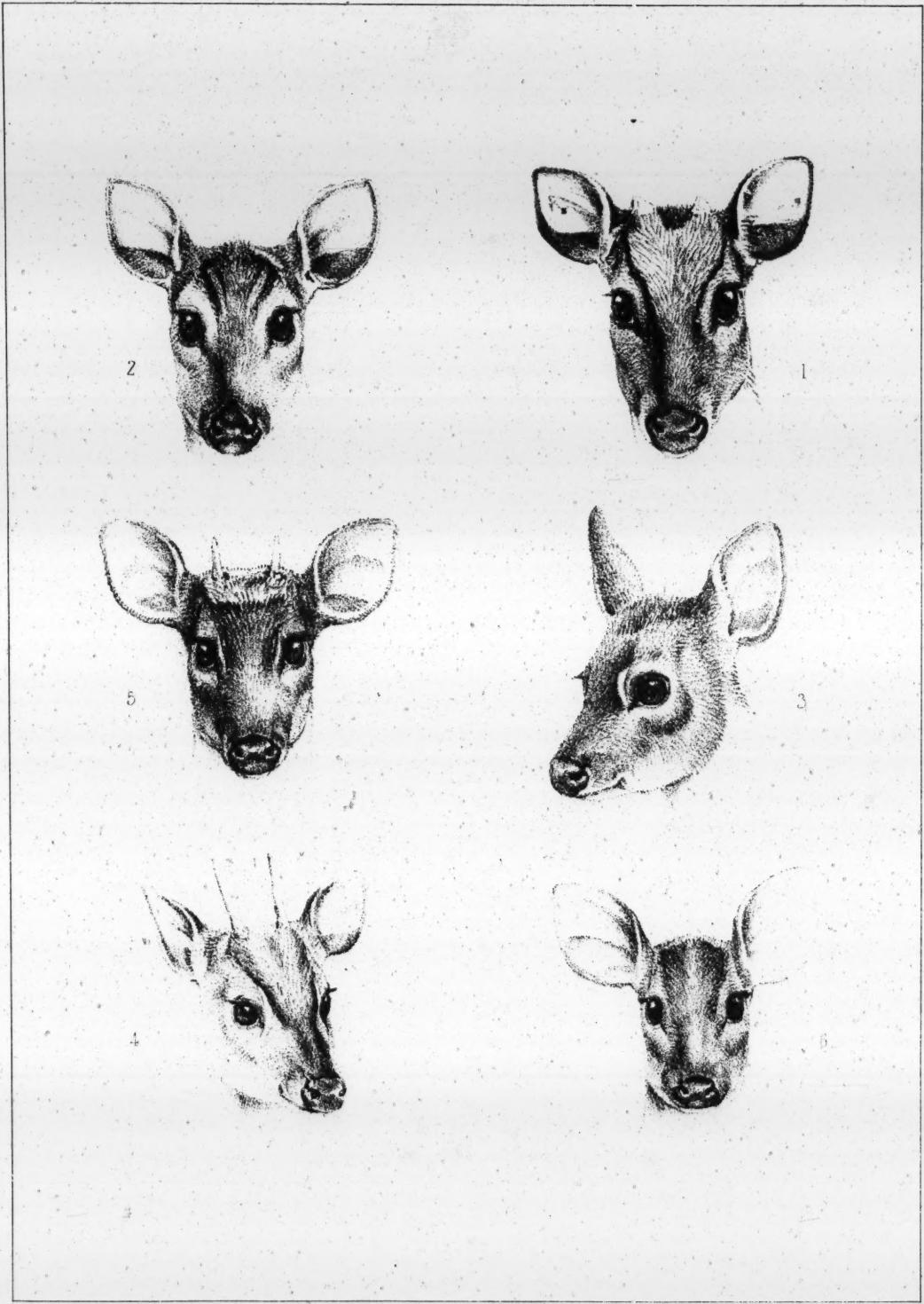




W. H. Hanchett, Imp.

COASSUS AURITUS, Gray.







3. ON THE HABITS OF *HELIX LACTEA*.
BY J. S. GASKOIN, F.Z.S. ETC.

As all facts relating to animated nature, elucidating the habits and powers of living creatures, however low their station in the scale of creation, must be interesting and instructive, I do not hesitate to place before the Zoological Society a few observations I have been enabled to make on some individuals of the genus *Helix*. In April 1849, I purchased four or five specimens of *Helix lactea* (African), and placed them in water to be cleaned for my cabinet; one, some hour or two after immersion, resuscitated, and escaped from the vessel. These specimens were selected from a great many others, all of which had been together in a dry dusty drawer in the dealer's shop for more than two years, and had been imported by a merchant of Mogadore, in whose possession they had remained, in a similar condition, for a still longer period. The test of submersion in water was afterwards practised on the whole stock of the dealer, and none reviving, it was concluded all were dead. I placed the living stranger under a large glass bell on a tub of earth, and it lived well on cucumbers and the outside leaves of cabbages, &c., quite alone, until the end of the following October, when I discovered about thirty minute black helices, not the twenty-fifth of an inch in diameter, crawling on the inside of the glass, on the mould, &c. At first I had doubts as to their origin, but with growth the markings and form of my African captive being approached, the point was no longer to be mistaken. Some of these are now (October 30, 1850) nearly as large as the parent, which measures $1\frac{5}{8}$ inch across the long diameter of the aperture, although the lip in no instance has begun to evert; thus twelve months have not sufficed to attain the adult state. Now as the *Helix* is known to be bi-sexual, and not hermaphrodite, it follows that in this instance impregnation or conception must have occurred prior to the capture of the animal, after which it fell into a state of suspended animation, and is traced to have remained so for more than four years; and we know nothing of the time it may have remained in the hands of the native gatherer before he took his collectings to the town dealer for sale; and I see no reason why, vitality having been latent for so lengthened a period, it might not have continued so almost indefinitely, and on the restoration of animation all the functions of the system resumed at once their natural powers: and what is most remarkable, utero-gestation resumed its process to accomplish the period, from the time it had been arrested, as though no circumstance had suspended the operation, and the time destined by Nature for its completion. I conclude the *Helix* to be insusceptible of prospective fecundation, that is, one communication of the sexes being sufficient for more than one conception, or there would probably before this time have been another brood of young ones, as the parent is still living and flourishing.

To render this paper more perfect, I will add a few other examples relating to the same subject. Dr. Baird has recorded in the 'Annals of Natural History' for July last, the circumstance of an Egyptian *Helix*, the "Snail of the Desert," the *Helix maculosa* of De Féussac, having remained gummed to a tablet in a show-case of the British

Museum during four years, when the excently formed epiphragm being observed tablet and placed in tepid water, and in It fed on cabbage-leaf, and began very pair of the aperture of its shell, which capture, the suspension of animation hove the work. It resuscitated on the 15th of neither signs nor result of fecundation, a

I am indebted to Mr. T. Vernon Wo entomological pursuits, during a two sea with a no less fruitful and valuable res logy) for several species of living mollusk nous to Madeira and its adjacent rocks: dry canvas bags for a year and a half, and by placing them in water. They were flower-pots filled with mould, or in large Three individuals of the *Helix undata* deposited more than two hundred small, eggs, which, on exposure to the air, soon not in a covering, nor agglutinated, but One portion or nidus, about sixty in number to their situation, about three-quarters covering them with mould, hoping the incubation. The parents burrowed the earth, remaining in that position some forced themselves, shell and all, below the ova. Other species have also produced

Curious and instructive as these facts nuance of the vital principle in mollusk element may seem still more so, especially which has so much less perfectly the power of atmospheric air on its animal substantia mation is a quality obviously necessary and other shallows, which of course at c dried, or the existence of the species would Unio, which lives in ponds, and much more *Unio tumidus* of Retzius, but is sometimes packed up by the Rev. Robert King, or at Wide Bay in Australia, having been 231 days, but was first submitted to the opened and it was alive. On its arrival latter end of June 1850, 498 days after pond, Mr. Newnham, to whom it was what Mr. King had written, a second time expanded its valves and was living. It was to the British Museum, and is restored to its powers, in the care of Dr. Baird of that indebted for this relation.

I have now living, the *Helix Fraseri*, *H. turricula*, Madeira; *H. laciniosa*, M. *H. tectiformis*, Madeira; and the *Car-*

When the existence of an apparently regaining observed, it was removed from the water, and in a short time crawled away. It began very soon the completion of a shell, which had been broken prior to its formation having arrested the execution of the 15th of March last, but has shown no foundation, although still living.

Vernon Wollaston (who interspersed his two seasons' residence on the island, valuable research in terrestrial conchoing mollusks, principally *Helices*, indigenous rocks: all these had lain in a box in a half, and had been restored to vitality. They were put under glass shades, or in large glass cases, and all fed well. *Fix undata* of Lowe, within forty hours, dried small, white, semipellucid pearl-like in the air, soon became of an opaque white; situated, but together, loose in the earth. Sixty in number, I immediately restored three-quarters of an inch below the surface, hoping therefrom to learn the period of crowded their heads and bodies into the position some twenty or thirty hours, or all, below the turf, and so deposited their o produced eggs.

As these facts may be, perhaps the continuation in mollusks removed from their native life so, especially in the case of a bivalve, directly the power of excluding the influence of animal substance; yet the latency of animal necessary for the inhabitants of ponds and streams at certain seasons are liable to be species would soon become extinct. An *Helix* and much resembles the British species, but it is somewhat higher and shorter, was sent to Mr. King, on the 26th of January 1849, having been enclosed in a dry drawer for submitted to the test of water, when its valves closed in its arrival at Southampton about the 3 days after it had been taken from the place from which it was consigned, in consequence of a second time placed it in water, when it became living. It was then forwarded, *inter alia*, and is restored to its element with full vital power of that establishment, to whom I am

ix Fraseri, Australia; *H. lactea*, Africa; *acutinosa*, Madeira; *H. undata*, Madeira; and the *Carocolla Wollastoni*, Madeira.





I. Wolf Lith.

PALÆORNIS DERBIANUS, Fraser.

Proc. Z. S. Aves, XXV.





M. & N. Hartart Imp.

PALAEORNIS ERYTHROGENYS. FRASER.

J. Wolf Lith.

4. ON NEW BIRDS IN THE COLLECTION AT KNOWSLEY. BY MR.
LOUIS FRASER. IN A LETTER TO THE SECRETARY.

(Aves, Pl. XXV.—XXIX.)

Knowsley Hall, November 11, 1850.

SIR,—Having received a notification, through Lord Derby, of my appointment to the Consulship at Whydah, my stay in England is necessarily drawing to a close. I have endeavoured to meet your wishes by forwarding a few brief descriptions from novelties contained in this extraordinary Collection, and with his lordship's permission I forward the original drawings made by Mr. Wolf, who has been engaged here for some considerable time.

I have the honour to be, Sir,

Your obedient servant,

LOUIS FRASER.

D. W. Mitchell, Esq., Sec. Zool. Soc. Lond.

The first specimen to which I would wish to draw the attention of the Society is a Parrakeet of large size, which I propose calling

PALÆORNIS DERBIANUS. (Aves, Pl. XXV.)

Forehead, round the nostrils, a small stripe from the nostrils to the eyes, and a broad moustache, black; head, towards the bill and round the eyes, green, passing into a light violet-blue on the occiput and ear-coverts; the remaining upper parts of the bird, the thighs, vent and under tail-coverts green, being more yellow on the back of the neck and centre of the wings; the shafts of the two centre-tail-feathers dark purplish brown, with their webs, towards the apex, blue; from the hinder part of the ears, down the side of the neck, and behind the moustache, runs a narrow line of light rose-coloured purple, which colour extends over the whole under surface; the under side of the tail-feathers greyish yellow; bill black; feet the usual parrakeet colour; eyes pale straw-colour.

Length from base of beak to tip of tail, 20 inches.

Curve of upper mandible..... $1\frac{5}{8}$ "

Wing..... $8\frac{3}{8}$ "

Tail..... $10\frac{1}{2}$ "

Hab. —?

This specimen has been many years in this collection, and I have chosen for its specific name that of its noble owner. The species is easily distinguished from all the other members of the genus by its larger size, and the colours of the bill, head and breast.

The next bird is a second species of the same genus.

PALÆORNIS ERYTHROGENYS. (Aves, Pl. XXVI.)

Male: Green; the back, between the shoulders, mealy; cheeks and ear-coverts red, which colour passes on to the hind head, where

it meets, in a more rosy tint; moustache black; the tips of the two centre tail-feathers blue; upper mandible red, lower black; legs grey.

Length from base of bill to end of tail,	$15\frac{1}{2}$	inches.
Curve of upper mandible	$1\frac{3}{8}$	"
Wing	$7\frac{1}{2}$	"
Tail	9	"

Hab. — ?

This bird is nearly allied to *P. longicauda*, Bodd., but is larger; the tint on the cheeks is different; the belly and under wing-coverts are green; the primaries are not edged with blue; the centre tail-feathers are only blue for half their length; and the rump is green.

CRAX ALBERTI. (Aves, Pl. XXVII. XXVIII.)

Male: Black, with blue gloss; the lower part of the belly, vent, under tail-coverts, and the tips of the tail-feathers, white; cere beautiful azure blue; bill yellowish green horn-colour; eyes dark hazel.

Female: Red-brown; head and crest-feathers barred alternately with black and white; rump and tail barred with brown, yellow and dark brown; bill black horn-colour; eyes dark hazel.

Hab. — ?

The pair of birds from which the accompanying descriptions and figures were taken, are now living in his lordship's aviaries. A new and beautiful species of a limited family like the Curassows must be looked upon as a valuable addition to our stock of ornithological acquaintances, and deserving of a distinguished cognomen. I therefore propose to name it after Her Most Gracious Majesty's illustrious consort, His Royal Highness Prince Albert, forming at the same time a companion to my *Goura Victoria*.

The male is at once distinguished from its nearest ally (*Crax Alector*, Linn.) by the blue cere: the female differs from all the specimens I have had an opportunity of examining by the broad bands on the tail.

PENELOPE NIGER. (Aves, Pl. XXIX.)

Male: Black, with blue, and in some lights green reflections; bill, throat (nearly naked), tarsi and feet red.

Female: Brown, with green reflections, each feather having several bars of rust-colour, the colour and markings being less distinct on the under surface of the bird.

Length from base of beak to tip of tail, 23 inches.

Gape	$1\frac{1}{2}$	"
Wing	9	"
Tail	$11\frac{1}{2}$	"
Tarsi	$2\frac{3}{4}$	"

Hab. — ?

There are three specimens in this museum, two males and one female; one of the males lived in the aviaries for many years.

Proc. Z. S. Aves, XXVII.

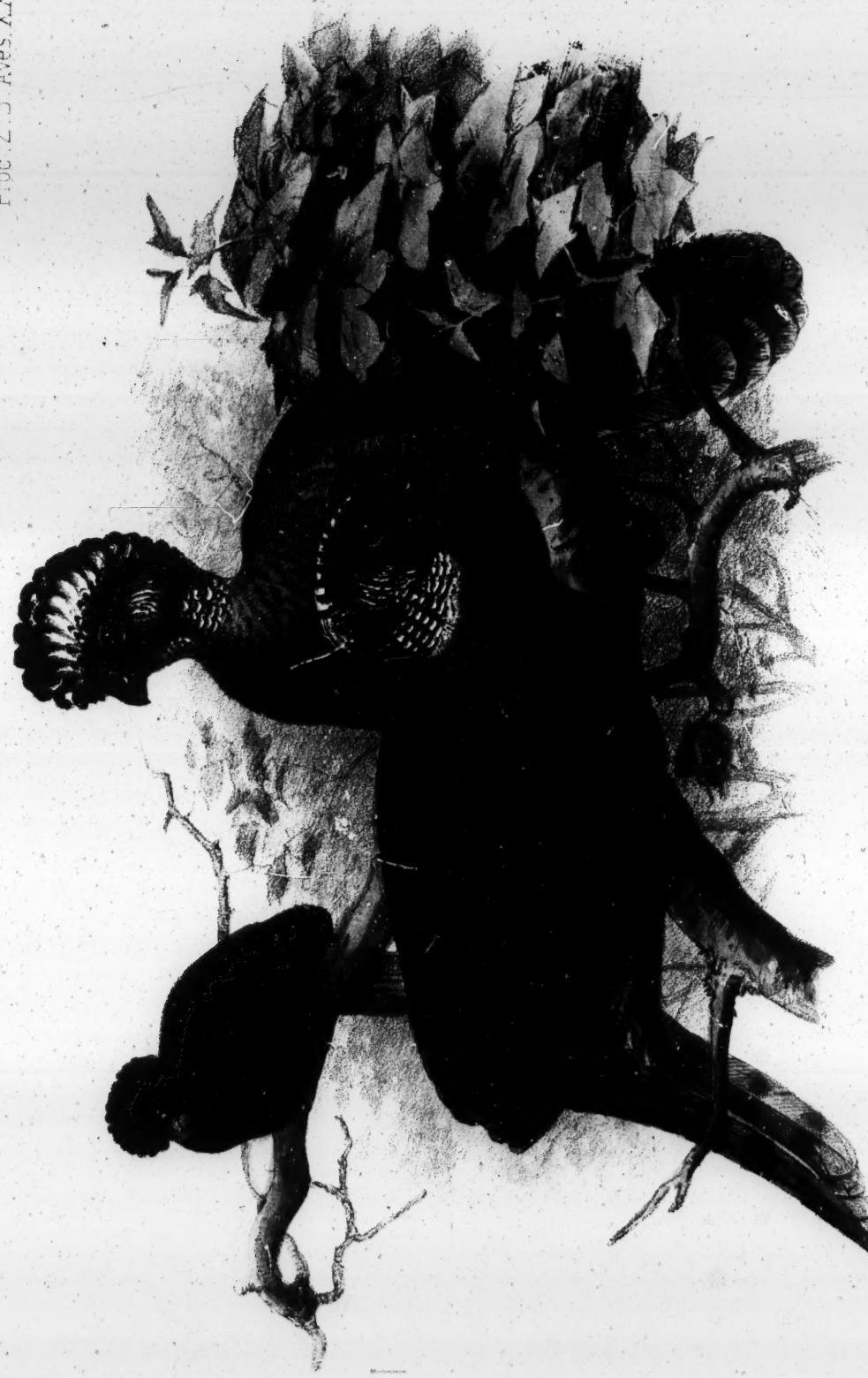


J. Wolf Lith.

M. & N. Hanhart Imp.

CRAX ALBERTI, Fraser. ♂



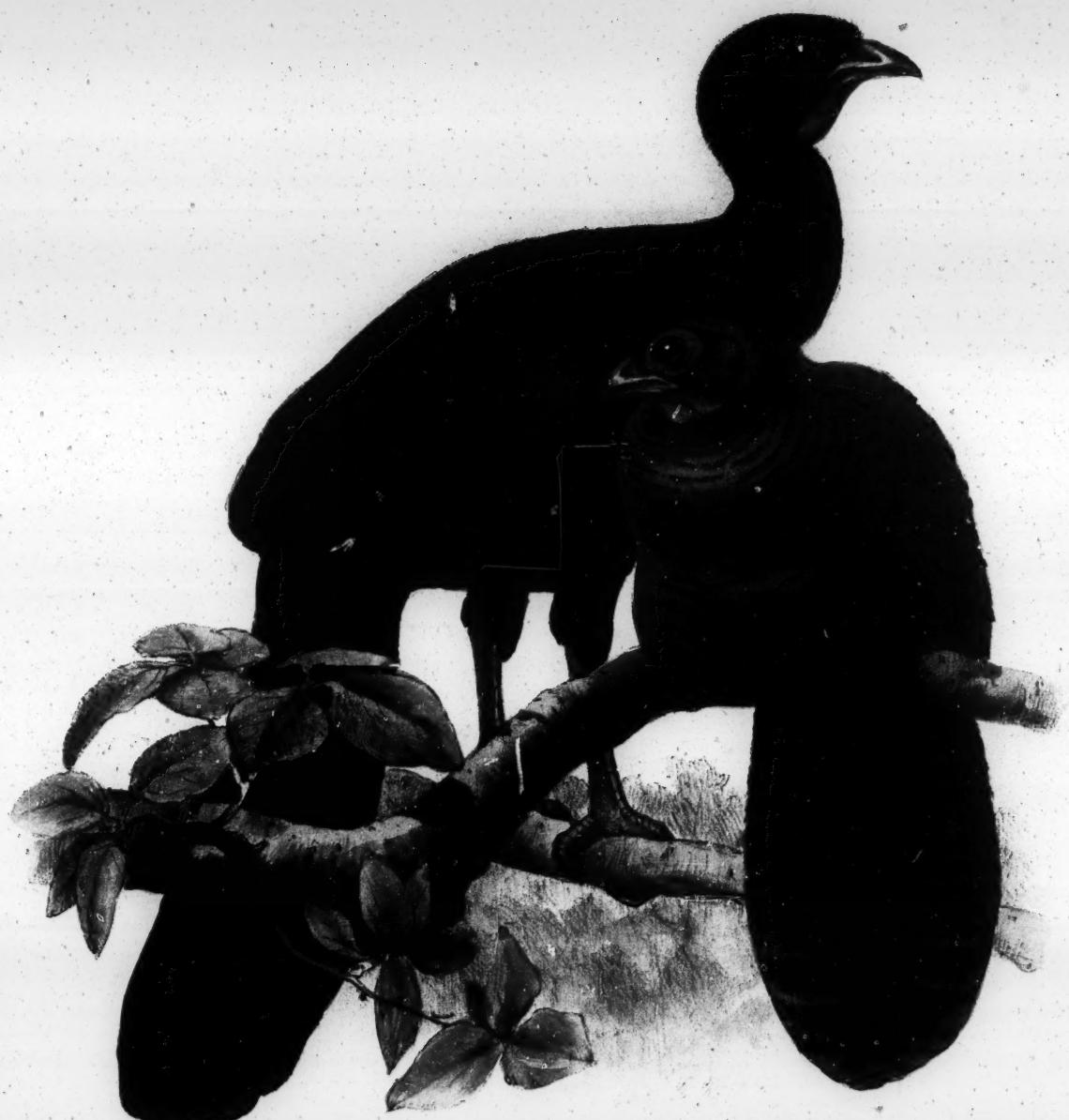


M & N Hanhart, imp.

J. Wölff, Lith.

CRAX ALBERTI Fraser ♀.





J. Wolf, Lith.

M. & N. Hatchart, Imp.

PENELOPE NIGER, Fraser.



5. AN ACCOUNT OF FISHES DISCOVERED OR OBSERVED IN MADEIRA SINCE THE YEAR 1842*. BY THE REV. R. T. LOWE, M.A.

Family ZENIDÆ.

1. **ZEUS CONCHIFER.** *Lilacino-cinereus, capite inermi; thorace pinnaque dorsali analique utrinque scutatis; spinis dorsalibus anterioribus brevissime filamentosis; pinnis ventralibus 1+5-radiatis; caudali lunata.*

D. 9 v. 10+25 v. 26; A. 2+(1+25 v. 26); P. 13; V. + 5;

C. $\frac{1+I.+V.}{1+I.+VI.}$; M. B. 7; Vertebræ, 13 abd. + 21 caud. = 34.

An example of this very fine new Dory was communicated, with a short notice, to the Zoological Society in 1845†. The row of large and remarkable naked bony scutellæ on each side, at the base of the dorsal and anal fins, and along the breast or ventral line, afford a very striking character. They resemble the depressed shells of a *Fissurella* seen in profile, and are beautifully radiato-striate, with a bright iridescent rose or lilac lustre, like the inside of a *Trigonia*. The umbo forms a smooth short strong spine or recurved prickle. The dark thumb-mark on the middle of the sides is present, as in *Z. Galillus*, L. Three examples only have occurred, measuring from eighteen inches to a little more than two feet in length.

The supposed affinity between *Zeus* and *Oreosoma*, Cuv.‡, is much corroborated by this fish.

2. **ARGYROPELICUS OLTERSII.** (*Sternoptyx Olfersii*, Cuv. R. An. (2nd edit.) ii. 316. t. 13. f. 2.)

A single example, caught with a boatscoop on the surface of the water in the Bay of Funchal, June 6, 1845.

The name of *Pleurothysis*, proposed in the 'Fishes of Madeira,' p. 64, for this portion of the Cuvierian genus *Sternoptyx*, has been anticipated by that of *Argyropelicus*, previously assigned to a Mediterranean species by the Italian naturalist Cocco, and adopted in the 'Fauna Italica' by the Prince of Canino.

I have now succeeded in obtaining both the Cuvierian species of *Sternoptyx* in this part of the Atlantic; though *St. diaphana* (Le St. d'Herman, Cuv.) cannot, like *Arg. Olfersii*, be perhaps fairly claimed at present to belong to the Madeiran fauna §.

The Atlantic and Mediterranean species of *Argyropelicus* may be thus distinguished :

ARG. OLTERSII, Cuv. *Corpore altiore, altitudine dimidium longitudinis (dempta pinna caudali) superante; parte postica (caudali) abbreviata; capite duplo altiore quam longo; sterno*

* Proc. Zool. Soc., June 1843, part 11. p. 81.

† *Ibid.* part 13. p. 103.

‡ Fishes of Madeira, Preface, p. xii.

§ Proc. Zool. Soc. part 11. p. 85.

postice in forcipem, præoperculo inferne in aculeum simplicem desinente. (St. Olfersii, Cuv. l. c.)

ARG. HEMIGYMNAS. Cocco. *Corpore angustiore, altitudine di- midium longitudinis (dempta pinna caudali) æquante; parte postica (caudali) elongata; capitum longitudine altitudinem æquante; sterno postice in angulum simplex acutum, præoper- culo inferne in aculeos duos desinente.* (Arg. hemigymnus v. Sternoptyx mediterranea, Cocco et Buon. *Faun. Ital. cum fig.*)

This extraordinary group of fishes offers many points of analogy with *Berycidae*.

Fam. **LICHIIDÆ.**

3. **TEMNODON VADIGO.** (*Lichia vadigo*, Cuv. et Val. viii. 363. t. 235.)

A single example was taken in February 1846, but it appeared to be quite unknown to the fishermen, and is therefore to be regarded as a mere straggler in these seas.

If the genus *Temnodon* be retained, this fish has precisely the same claims to a place in it as the common "Anchova" of Madeira (*T. sal- tator*, Cuv. et Val.).

Fam. **SCOMBRIDÆ.**

4. **SCOMBER COLIAS** (Gm.), Cuv. et Val. viii. 39. t. 209. (*The Spanish Mackerel*, Yarr. Brit. Fish. i. 131.)

In April 1844, the market in Funchal was plentifully supplied with these fishes for two or three successive days. They were said to have been brought from Porto Santo.

5. **AUXIS VULGARIS**, Cuv. et Val. viii. 139. t. 216.

A single example, February 3, 1845. Not quite unknown to the fishermen, but its occurrence said to be a mere chance.

6. **PELAMYS SARDÆ**, Cuv. et Val. viii. 149. t. 217.

October 27, 1844: a single example, called "Sarda" by the fishermen, to whom it is not absolutely unknown, though, like the last, of merely casual occurrence.

Fam. **TÆNIOIDÆ.**

7. **TRACHYPTERUS GRYPHURUS.** *Corpore elongato, macula poste- riore laterali spatio tertiam partem totius longitudinis æquante a basi pinnæ caudalis amota; pinnarum radiis scabris; linea laterali inermi, postice supra marginem ventrale desinente.*

D. 5 + 166; P. 10 v. 11; V. 1 + 5; A. 0; C. $\frac{VIII.}{5}$; M. B. 6.

Intermediate between *T. falx* and *T. iris* of Cuvier and Valen- ciennes' "Histoire," vol. x. pp. 333, 341; approaching, perhaps, nearest to the latter, but differing in its deeper shape ($D = \frac{L}{5\frac{1}{2}}$, instead

of $\frac{L}{9 \text{ or } 10}$), and in the backwarder position of the third dark side-spot. The ventral fins are short, only equalling one-twelfth of the body without the caudal fin, and the four first produced rays of the first dorsal are equal in length to the ventral fins. The lateral line ends as in MM. Cuvier and Valenciennes' figure (t. 297) of *T. iris*, but is quite unarmed. The ventral line is serrulate, and the whole surface, particularly towards the ventral line, is finely shagreened or granulate; the granulations becoming stronger towards the ventral line, as in the same figure.

In shape and proportions it agrees better with *T. falx*, but differs in several important particulars from MM. Cuvier and Valenciennes' description of that fish.

The only individual examined of this beautiful and extraordinary fish occurred in June 1845, and has been added by me to the collection of the Cambridge Philosophical Society. It was scarcely quite dead when I first saw it, and was in the most perfect state of preservation. Another *Trachypterus* had occurred in June 1844, and was probably the same species; but the example was unfortunately thrown away by the person to whom it had been mis-sent without my seeing it. It was said to have been about three feet long.

The whole body is pure bright silver, appearing as if frosted from the fine granulations of the surface. The fins are of a delicate scarlet or vermillion, the lower point or angle of the caudal being tipped, and the hinder end of the dorsal edged with black. On the sides are three blackish oval or elliptic spots. This example was twenty-five inches long, exclusive of the caudal fin, which resembles a bat's or griffin's wing, and is erected in a fan-like manner; the lower lobe or portion being suppressed or undeveloped, and only indicated by the presence of five short spinules or abortive rays.

Fam. LABRIDÆ.

8. *LABRUS LARVATUS*. *Flavus, capite humerisque griseo-nigrescente larvatis; pinna dorsali antice caudaque utrinque infra lineam lateralem rectiusculam unimaculatis; corpore oblongo elongato; dentibus validis crebris, antice biseriatis; pinnæ caudalis apicibus analisque ventraliumque margine cæruleo-nigris.*

D. 17+13; A. 3+11; P. 16; V. 1+5; C. $\frac{3 \text{ v. } 4+VI}{2 \text{ v. } 3+V}$; B. M. 5;

Squamæ lin. lat. 42—45.

In general appearance, shape, and the peculiar straightness of the lateral line, this fine species much resembles *Cossyphus Darwini*, Jen.; but it is a true *Labrus*, with the dorsal and anal fins naked, and the preopercle quite entire. Its nearest allies are therefore *L. mixtus* and *L. Scrofa*; from which however, besides other characters, the numerous strong teeth distinguish it. A single example only has occurred, measuring seventeen inches and a quarter in length.

Fam. CHEIRONECTIDÆ.

Gen. CHAUNAX, Lowe.

Gen. Char. Corpus subcubico-oblongum, sufflabilis, nudum, cutes praesertim ad ilia ventremque flaccidissima laxa; antice obesum, postice abrupte attenuatum subcompressum. Caput osseum magnum subtetrahedrum, superne nuchaque latum planatum, utrinque s. ad genas declive; oculis lateralibus, spatio interoculari convexo; ore rictuque amplissimis transversis plagio-plateis s. depresso. Dentes intermaxillares vomerinique palatinique parvi scobinati. Nares simplices (nec pedicellatae nec tubulosæ). Spiracula (foramina branchialia) postica s. ad ilia pone pinnarum pectoralium axillas. Pinna dorsalis unica; pectoralibus (pedicellatis) carnosus; ventralibus jugularibus spathulatis carnosus; analis postica; caudalis simplex truncata. Cirri, praeter unicum in fossula internasali, nulli.

9. *CHAUNAX PICTUS*, Lowe in Trans. Zool. Soc. iii. part 4. p. 340.
t. 51.

D. 11; A. 5; P. 11; V. 4; C. $\frac{1+IV}{2+II}$.

Species adhuc unica. *Hab.* in mari Maderensi.

I have nothing to add to the full account of this curious fish above referred to, except by way of correction to the second paragraph in p. 344, which has been erroneously printed, and should stand thus:

"Whilst *Cheironectes* seems its most natural, *Halieutæa* is its nearest technical ally. Agreeing with *Lophius* in the wide transverse mouth, and in the backward position of the breathing orifices in the flanks, but with *Cheironectes* more in shape, in the granular or velvety roughness of the skin, and in colour; it differs from both, and approaches *Halieutæa*, in the absence of crests or cilia on the back, and in the single dorsal fin. In these last two points, and in the roughness of the skin, it agrees with *Halieutæa*, but differs in its Diodon-like shape, and in the position of the breathing-holes considerably behind, instead of above or before, the axils of the pectoral fins."

Fam. SCOPELIDÆ.

Gen. PHÆNODON.

Gen. Char. Caput magnum compressum, oculis magnis, rostro brevissimo obtuso, rictu magno pone oculos longe diducto, mento subitus ad symphysin cirro barbato. Dentes intermaxillares uniseriati; anteriores (5 v. 6 utrinque) validi tenues prælongi lanarii subrecurvi remoti distincti, extrorsum supra labia invicem claudentes; ossibus palati dentibus minoribus uniseriatis, lingua biseriatis, armatis. Opercula simplicia plana. Corpus elongatum compressum nudum? s. exsquamatum; abdomine punctis argenteis (ut in SCOPELO) seriatis. Linea lateralis recta pinnæque fere ut in SCOPELO, pectoralibus brevioribus.

10. PHÆNODON RINGENS. (*Scopelus barbatus*, nob. MS. olim.)

1^{ma} D. 16; 2^{da} D. 0; A. 16; V. 7; P. 9; C. $\frac{9+I.+IX.}{6+I.+VIII.}$; M. B. ?

Closely allied to *Scopelus*, but with the head and teeth of *Echostoma*, which it also resembles in its single cartilaginous beard or barbule.

A single example occurred in May 1845, and was placed by me in the collection of the Cambridge Philosophical Society, under the MS. name of *Scopelus barbatus*. It was seven inches long, and the above fin-formula is taken from it.

I have been favoured by the Duc de Leuchtenberg this winter with the opportunity of examining a second individual, procured from a fisherman. It agreed in all important details with the former, but was only from five to six inches long, and had a much shorter barbule.

Both these examples were entirely devoid of scales, but from certain appearances I am inclined to attribute this defect to injury.

The colour is a uniform brownish or coal-black, except the silver pits, which are disposed in rows along the throat and belly, exactly as in *Scopelus*.

11. SCOPELUS MADERENSIS (Suppl. in Trans. Zool. Soc. iii. part 1. p. 14).

Appears to be distinguished from *Sc. Humboldti* by the forwarder (medio-dorsal) position of its first dorsal fin, and by the long pectoral fins, which are contained from four to four and a half times in the whole length, and reach to the end of the base of the first dorsal fin. The anal fin has fourteen rays.

Examples have occurred of two other forms or species, with shorter pectoral fins, in one of which the anal fin has fourteen, and in the other twenty-two rays. In the first of these, the length of the pectoral fin is one-sixth of the whole length of the fish ($P = \frac{L}{6}$); in the second it is one-fifth and four-sevenths of the same ($P = \frac{L}{5\frac{4}{7}}$); *i. e.* rather longer. But further investigations will be requisite before these can be safely proposed as species. In general habit, colour, and appearance, they agree with *S. maderensis*.

12. METOPIAS TYPHOLOPS (Proc. Zool. Soc. 1843, vol. xi. p. 90).

Another example has occurred of this most curious and anomalous little fish. It was brought to me in May 1849, from the same place, Magdalena, at which I obtained the former. It is of much larger size, measuring three inches and a half in length. I find nothing whatever to correct in the account above referred to, except that the maxillary teeth, instead of being "uniserrate," are in a scobinate or brush-like band in both jaws; narrow in the upper, broader in the lower jaw.

The acquisition of a second example, confirming the peculiar characters before set down, is the more satisfactory, from the former

having been unfortunately destroyed by the wasting of the alcohol in which it was kept.

Fam. GADIDÆ.

13. *PHYCIS FURCATUS*, Flem. (not Bowdich); Yarr. Brit. Fish. ed. 1. ii. 201. (*Le Merlus barbu*, Duham. Cuv. R. An. ed. 2. ii. p. 335.)

A single example occurred May 8, 1845; not quite agreeing with the figure in the 'British Fishes,' yet certainly distinct from the common "Abrotea" of Madeira (*P. mediterraneus*, Lar.), of which, on the other hand, the *P. furcatus* of Bowdich (Excurs. p. 122. f. 28) was unquestionably a mere accidentally fork-tailed individual.

Fam. ECHENEIDÆ.

14. *ECHENEIS VITTATA*, Suppl. to Synops. in Trans. Zool. Soc. vol. iii. part 1. p. 17, and Hist. Fish. Mad. p. 77. t. 11.

The acquisition of an adult example measuring 2 feet 6½ inches in length, has proved the fish above described to have been a young individual of *E. vittata*, Rüppell (Neu. Wirbel. p. 82). It is fortunate that the happy coincidence of name necessitates no change or confusion in rendering justice to my learned friend's prior claim in the establishment of this well-marked species. The lateral dark band or *vitta* becomes indistinct in adult individuals. In the large full-grown example above mentioned it had disappeared entirely.

Fam. MURÆNIDÆ.

Gen. *LEPTORHYNCHUS*, *nob.*

Gen. *Char.* Caput scolopaciforme, callo elongato distinctum; maxillis in rostrum tenue productis, utraque dentibus minutissimis lime instar scabra; rictu pone oculos diducto. Nares oculis contiguae approximate, simplices nec tentaculatae. Oculi magni. Corpus nudum anguilliforme compressum, gracile, elongatum; postice longissime attenuato-productum filiforme, apice acuto. Aperturae branchiales sat magnæ, ante pinnas pectorales oblique deorsum fissæ. Pinnae pectorales distinctæ lanceolatae, sat magnæ; pinna dorsali ad nucham paullo ante, anali ad gulam paullo post pinnas pectorales incipiente; utraque usque ad apicem caudæ continuata, membranacea, nec cute cooperta, sed radiis sat validis distinctis.

15. *LEPTORHYNCHUS LEUCHTENBERGI*. (*The Snipe-Eel.*)

I am indebted for an opportunity of describing this interesting new type of *Murænidæ* to the favour of His Imperial Highness the Duke de Leuchtenberg, to whom an example was brought by a fisherman in January last. It approaches the *Anguillidæ* by its well-developed pectoral fins. The prolonged beak-like muzzle also reminds one of that of *Leptognathus*, Swainson. The unique individual examined, which measured 2 feet 9 inches in length, scarcely half an inch in height, and four lines in thickness, is included in the extensive col-

lections formed with so much scientific ardour and discrimination by His Imperial Highness the Duc de Leuchtenberg, during his late six months' residence in Madeira.

Fam. BALISTIDÆ.

16. MONACANTHUS AURIGA. *Hispidus, cauda utrinque dense hispido-villosa; pallide olivaceo-murinus, sublutescens, fuscolutoso-maculatus v. interrupte longitudinaliter subfasciatus; fasciis luteis inconspicuis evanescentibus 3 v. 4 ab oculis antice oblique radiantibus; radius 1 v. 2 anticis dorsalis prime aliquando in filamentum productis.*

1^{ma} D. 1; 2^{da} D. 31; A. 30 v. 31; P. 13 v. 14; C. 1+X.+1.

From eight to ten or eleven inches long. On each side, towards the base of the caudal fin, is an oblong patch, like plush or velveteen, of close thickset hairs or bristles. The occasional production of the second or first two rays of the second dorsal fin is perhaps sexual. Such examples have the muzzle rather longer and more produced before the eyes than those which have not the elongated dorsal filament. They are perhaps the *M. filamentosus* of M. Valenciennes, to whose figure and description, however, in MM. Webb and Berthelot's 'Canarian Fishes,' I regret I have not access.

Several examples have occurred, chiefly in the autumn, during the last five or six years, of this previously in Madeira unobserved or unrecorded species.

SQUALIDÆ.

Fam. ALOPECIDÆ.

17. ALOPIAS VULPES, Buon. (*The Fox Shark*, Yarr. ii. 379.)

An example occurred this spring of unusual size, measuring eighteen feet in length, of which the tail was ten feet. The skin was preserved by the Duc de Leuchtenberg.

Fam. SPINACIDÆ.

18. CENTROPHCRUS SQUAMOSUS, Müll. und Henle, p. 90, with a figure.

The *Ramudo* or *Raimudo* of Madeira, not unfrequently taken off the Dezertas at a depth of twelve or fourteen "linhas," i. e. from 350 to 400 fathoms, belongs apparently to the above species, the habitat of which was unknown to its describers, MM. Müller and Henle. I have only examined female examples, and the fishermen profess themselves to be entirely unacquainted with the male, which I have however formerly (March 10, 1838) once seen, though without opportunity for a close or accurate examination, and so perhaps without remarking any spine near the tips of the claspers or ventral fin-appendages. The individuals examined were five or six feet long, but the fish is said to grow to a much larger size.

Madeira, May 25, 1850.

December 10, 1850.

Prof. Owen, V.P., F.R.S., in the Chair.

The following papers were read:—

1. DESCRIPTION OF SEVERAL NEW SPECIES OF ENTOMOSTRACA.
BY W. BAIRD, M.D., F.L.S. ETC.

(Annulosa, Pl. XVII. XVIII.)

Legion BRANCHIOPODA.

Order PHYLLOPODA.

Family APODIDÆ.

Genus LEPIDURUS, Leach.

1. LEPIDURUS VIRIDIS, Baird. (Pl. XVII. f. 1.)

Body of animal, including the flap of tail segment, about two inches long and one broad. The carapace and whole body are of a fine green colour, the carapace covering about two-thirds of the abdomen; the edges of the notch in the posterior part of carapace are strongly toothed, and those of the inferior half of the carapace are very finely serrated; these teeth are of two sets, the one much larger than the others; the larger teeth are of a green colour, tipped at the point with dark brown; they are about eleven in number, and between each there are two or three much smaller ones interspersed. The appendages of the first pair of feet are very short and small, scarcely extending beyond the edge of the carapace. The segments of the abdomen are each studded with a row of stout, slightly curved spines of a green colour tipped at their edges with dark brown. The tail flap is oval, keeled down the centre, the keel being beset with short sharp spines, and the edges of the flap are finely serrated. The long setæ of the tail are nearly the length of the whole animal, and are covered with short hairs.

Hab. Van Diemen's Land. British Museum.

Legion LOPHYROPODA.

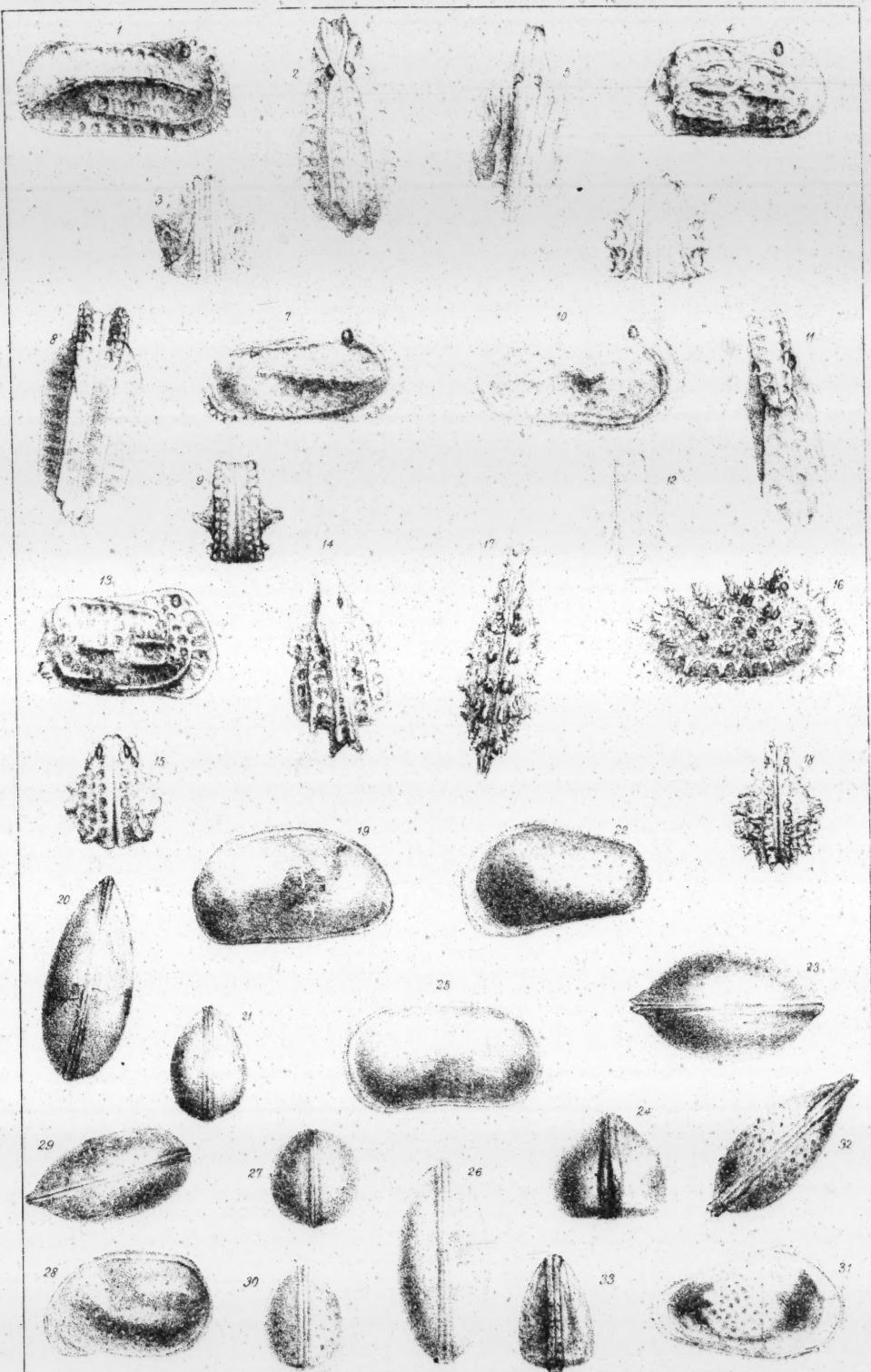
Order OSTRACODA.

Family CYPRIDIDÆ.

Genus CYPRIS, Müller.

1. CYPRIS DONNETII, Baird. (Pl. XVIII. f. 19-21.)

Carapace valves elongate oval. Anterior extremity narrower than posterior, and considerably flatter; posterior extremity rounded and very convex; dorsal edge arched; ventral slightly reniform. The surface of the valves is smooth and shining, of a brown colour, varie-



W. Wm. del. et lith.

Ford & West, Lithographers 54, Hatton Garden.

1,2,3. CY THEREIS FISTULOSA. 4,5,6. CY THEREIS DEFORMIS.

7,8,9. CY THEREIS RUNCINATA. 10,11,12. CY THEREIS AUSTRALIS.

13,14,15. CY THEREIS PRAVA. 16,17,18. CY THEREIS SENTICOSA.

19,20,21. CYPRIS DONNETII. 22,23,24. CYPRIS CUNEATA.

25,26,27. CANDONA LACTEA. 28,29,30. CY THERE SETOSA. 31,32,33. CY THERE TARENTINA.



gated with patches of a darker shade. The pediform antennæ are provided with about six bristles of considerable length.

Hab. Freshwater ponds, Coquimbo; collected by — Donnet, Esq., Surgeon R.N. Brit. Mus.; from the collection of H. Cuming, Esq.

2. **CYPRIS CUNEATA**, Baird. (Pl. XVIII. f. 22-24.)

Carapace valves wedge-shaped, much broader at anterior than posterior extremity. Dorsal margin highly arched; ventral deeply sinuated in the centre, giving the shell a reniform appearance. Valves very convex in the centre, and surrounded by a prominent margin, which at the anterior extremity, when highly magnified, is seen to be minutely and finely serrated. The whole carapace is of a deep green colour, and covered with fine hairs.

Hab. Duddingston Loch, near Edinburgh; August 1850.

Genus **CANDONA**, Baird.

1. **CANDONA LACTEA**, Baird. (Pl. XVIII. f. 25-27.)

Carapace valves oblong ovate, convex. Dorsal margin nearly straight; ventral slightly sinuated in the centre. Anterior and posterior extremities of nearly equal size. Surface of valves smooth and shining, and of a dull white colour.

This species resembles in shape the *Candona reptans*, but is only about one-fourth the size, and is of a uniform dull white colour.

Hab. Freshwater pond at Charing, Kent; collected by W. Harris, Esq., to whom I am indebted for specimens. Regent's Park (*T. Rupert Jones, Esq.*).

Genus **CY THERE**, Müller.

1. **CY THERE TARENTINA**, Baird. (Pl. XVIII. f. 31-33.)

Carapace valves obovate. Anterior extremity much broader than posterior, and having a broad flat margin striated on the surface and toothed round the edge; posterior extremity pointed, having the same margin, but not so broad, and with much fewer teeth. The valves are very convex in the middle, of a greyish colour, with a white patch in the centre, and are slightly pitted all over. Dorsal and ventral margins both somewhat prominent.

Hab. Tarentum. In Mr. Williamson's collection.

2. **CY THERE SETOSA**, Baird. (Pl. XVIII. f. 28-30.)

Carapace valves oval. Anterior extremity narrower than posterior. Dorsal margin arched; ventral sinuated about its anterior third. Surface of valves shining white, and studded all over with short stiff hairs.

Hab. Moreton Bay, Australia, and Tenedos. Mr. Williamson's collection.

Genus **CY THEREIS**, Jones.

1. **CY THEREIS AUSTRALIS**, Baird. (Pl. XVIII. f. 10-12.)

Carapace valves somewhat quadrilateral. Dorsal and ventral mar-

gins nearly straight. Anterior extremity broader than posterior, and finely toothed; teeth numerous. Posterior extremity emarginate on upper or dorsal edge, and toothed on ventral; teeth few, and stronger than those on anterior margin. Surface of valves roughened with small asperities, and having one tubercle on about the anterior third of its length. A raised margin encircles the whole valve.

Approaches very near *Cypridina hieroglyphica* of Bosquet, Entomost. Maestricht, t. 3. f. 4.

Hab. Moreton Bay, Australia. Mr. Williamson's collection.

2. **CY THEREIS RUNCINATA**, Baird. (Pl. XVIII. f. 7-9.)

Carapace valves ovate, flat. Anterior extremity broader than posterior, and rounded; posterior extremity emarginate on upper or dorsal margin. Surface of valves very flat and rugose; a flat projecting border surrounds each valve, which is serrulated at anterior extremity and toothed on posterior; a high raised sharp ridge runs across the centre of the valve somewhat in a diagonal direction, which is serrulated along its whole length, and a smaller similar ridge is seen near the ventral margin.

Hab. Tenedos. Mr. Williamson's collection.

3. **CY THEREIS FISTULOSA**, Baird. (Pl. XVIII. f. 1-3.)

Carapace valves nearly quadrilateral, elongate. Anterior extremity a little more rounded than posterior, and armed with seven or eight small teeth; posterior extremity armed with five or six larger teeth. Dorsal and ventral margins nearly straight. Surface of valves granular and ornamented by four elevated straight ridges, which are perforated near their margins with small round holes.

Hab. Manilla. Mr. Williamson's collection.

4. **CY THEREIS PRAVA**, Baird. (Pl. XVIII. f. 13-15.)

Carapace valves subquadrangular. Anterior extremity considerably broader than posterior, rounded, smooth round the edge, and having a broad flat margin beset on inner edge with small round tubercles; posterior extremity emarginate, and furnished on inferior half with several short teeth. Valves extremely gibbous in centre, and the surface very rough, wrinkled, and tubercled.

Hab. Tenedos. Mr. Williamson's collection.

5. **CY THEREIS DEFORMIS**, Baird. (Pl. XVIII. f. 4-6.)

Carapace valves ovate, short and gibbous; the two extremities of nearly the same size. Dorsal and ventral margins nearly straight. Surface of valves very coarsely granulated and tubercled; roughly ridged, but the ridges not perforated as in the preceding species.

Hab. Manilla. Mr. Williamson's collection.

6. **CY THEREIS SENTICOSA**, Baird. (Pl. XVIII. f. 16-18.)

Carapace valves flat, ovate. Anterior extremity broader than posterior, and rounded. Dorsal margin sloping towards posterior extre-

mity; ventral nearly straight. The surface of the valves is very rough, wrinkled, and beset all over, but especially near the margins, with strong spinous laciniae.

Hab. Tenedos. Mr. Williamson's collection.

Genus CYPRIDINA, M.-Edwards.

1. CYPRIDINA ZEALANICA, Baird. (Pl. XVII. f. 11-13.)

Carapace valves of an oval form, somewhat flattened, but convex in the centre and striated; the striae are numerous, close-set, and of a waved appearance. Surface of valves covered with minute punctations, which probably give origin in the fresh state to short hairs, though they are not visible in the dried specimens. The anterior extremity is slightly narrower than posterior. The whole carapace is of a uniform white colour. Natural size one-fourth of an inch long and one-fifth of an inch broad.

Hab. New Zealand. Two specimens were sent to the British Museum by the Rev. R. Taylor, of Waimati in New Zealand, along with a collection of marine and freshwater shells, but without any history attached to them.

2. CYPRIDINA INTERPUNCTA, Baird. (Pl. XVII. f. 8-10.)

Carapace valves oval. Anterior extremity narrower than posterior; the notch near anterior extremity very wide, and its anterior margin blunt and projecting in form of a beak straight upwards; posterior extremity obtusely rounded, and terminating near the ventral margin in a short blunt point. Dorsal and ventral margins nearly straight or slightly arched. The surface of the valves is of a dull white colour, and is densely and rather coarsely covered with impressed punctations.

The carapace is convex, but much less so than in *C. M'Andrei*, and is of a much more oval shape.

Hab. Near the Isle of Skye; collected by R. M'Andrew, Esq., August 1850.

3. CYPRIDINA MARIAE, Baird. (Pl. XVII. f. 5-7.)

Carapace valves elongate oval, of exactly the same size at each extremity; extremities rounded. Dorsal and ventral margins nearly plane, or very slightly arched. Surface of valves of a white shining colour, mottled with a few spots of a dull white, and covered with minute superficial punctations. Notch or ventral margin of anterior extremity blunt, leaving the upper and lower margins of the notch very obtuse.

Approaches *Asterope elliptica* of Philippi somewhat in figure of carapace, but is much more elongate, and is one-third larger.

Hab. Off the Isle of Skye; collected by R. M'Andrew, Esq., August 1850.

Pl. XVII. f. 2-4. *Estheria Dahalacensis*. Vide Proc. Zool. Soc. 1849, p. 89. No. 5.

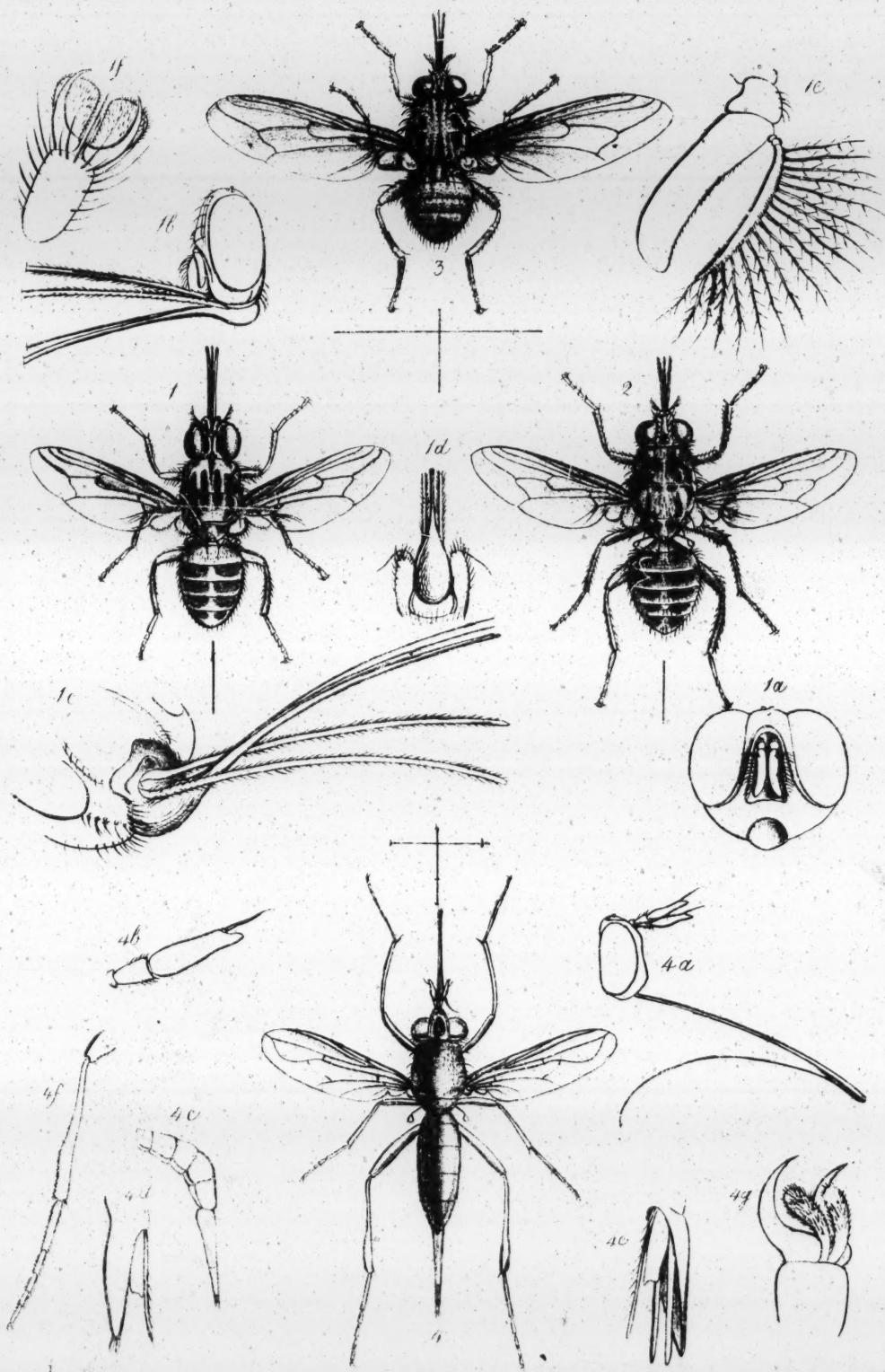
No. CCXVII.—PROCEEDINGS OF THE ZOOLOGICAL SOCIETY.

2. OBSERVATIONS ON THE DESTRUCTIVE SPECIES OF DIPTEROUS
INSECTS KNOWN IN AFRICA UNDER THE NAMES OF THE
TSETSE, ZIMB, AND TSALTSALYA, AND ON THEIR SUPPOSED
CONNEXION WITH THE FOURTH PLAGUE OF EGYPT. BY
J. O. WESTWOOD, F.L.S., PRES. ENT. SOC. ETC.

(*Annulosa*, Pl. XIX.)

The species of insects which attack the larger of our domestic quadrupeds may be divided into two chief classes; first, those which do so in order to obtain a supply of food for their own support; and second, those which do so with the object of depositing their eggs in such a position, that the larvæ, when hatched from them, will be certain of finding a proper supply of food derived from some part of the animal, either external or internal.

The insects composing the first of these two classes require for the performance of their dreaded functions an organization of the parts of the mouth especially fitting them to pierce the skins and hides of the quadrupeds upon the blood of which they subsist, and we accordingly find that it is precisely these insects which have the mouth-organs most fully developed in the different families to which they respectively belong. The *Stomoxys calcitrans*, and especially the different species of *Tabanus*, are pre-eminent in this respect; and the formidable array of lancets in the mouth of one of the latter insects is not to be met with elsewhere among the whole of the flies composing the order Diptera, to which they belong. The effects of the attacks of these insects upon the horse are perceived by the drops of blood which flow from the orifices caused by their bites, and sometimes these wounds are so numerous, that the beasts "are all in a gore of blood." A still smaller species, named by Linnæus the *Culex equinus*, also infests the horse in infinite numbers, running under the mane and amongst the hair, and piercing the skin to suck their blood. This insect, although given by Linnæus as a *Culex*, appears from his description to belong to the genus *Simulium*, to which genus also belongs an insect of fearful note, which attacks the horned cattle in Servia and the Bannat, penetrating the generative organs, nose, ears, &c. of these animals, and by its poisonous bite destroying them in a few hours. A species of the same genus of minute *Tipulidæ* is common in marshy districts in England, and I have often experienced its attacks, which have resulted in the raising of a tumour on the part of the flesh which has been attacked, attended by a considerable amount of local inflammation; and hence we may readily believe the well-authenticated effects produced upon the cattle above described. There are various other insects which attack the horse and ox, such as the *Hippoboscæ*, various species of ticks, *Anthomyiæ*, &c.; and if these do not, from their smaller size, cause a discharge of blood like the large *Tabanidæ*, it is certain that the irritation which they produce not only by their presence upon the skin, but also by the sharpness of their bite, must be very irritating to the quadrupeds which they infest.



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1. *LEPTAENIA MURICATA* (L.) G. TAUCHNOIDES Voss
2. *L. T. DENTIFORMIS* Westw. 4. *STYLOSTOMA LEONII* Westw.



The insects which do not themselves feed upon our cattle, but simply infest them for the purpose of depositing their eggs in some convenient place or other upon their bodies, are in no instance that I recollect provided with an increased development of the mouth organs; on the contrary, the *Estridæ* are either entirely destitute of a mouth, or have only very small rudiments of some of the ordinary parts of the mouth, so as to be entirely unfitted for biting or wounding cattle. The effects however which some of these species produce are as annoying as those caused by the bites of the *Tabani*. The female fly of the common horse bot, *Œstrus Equi*, it is true, instils no dread into the horse round which she is intently engaged in flying, depositing her eggs here and there in particular spots where the horse is certain to lick the hairs, by which means the eggs are introduced into the mouth and pass into the stomach. So little indeed is the horse affected by the presence of this insect, that I have often stood close to one round which the *Œstrus Equi* has been flying, until the latter has come within reach of my hand, when I have caught it without trouble. Another species, *Œstrus hæmorrhoidalis*, is however much more troublesome; depositing her eggs on the lips of the horse, and producing in her endeavours to effect this such an excessive titillation, as to cause great uneasiness to the horse, which tosses its head about to drive off its enemy, gallops about, and as a last resource takes refuge in some neighbouring water, where the *Œstri* never follow it. The same kind of effect is also produced in rein deer by the *Œstrus Tarandi**, and in oxen by another species of *Œstrus*, *Œst. Bovis*, respecting which however much difference of opinion has arisen. At certain seasons, the whole terrified herd, with their tails in the air, or turned upon their backs, or stiffly stretched out in the direction of the spine, gallop about the pastures, finding no rest till they also get into the water. This *Œstrus* is asserted by some writers to make a strong humming noise, and hence it has been supposed that the herd of cattle are alarmed at the noise; but this must surely be an incorrect conjecture, as the *Œstri*, if they make any hum at all, are far outstripped in this respect by many other insects which instil no dread into oxen. Neither are they alarmed in consequence of being subjected to the same kind of attack upon so sensitive a part as the lips, as is the case with the horses attacked by *Œstrus hæmorrhoidalis*. It is however asserted by some writers, that the dread is produced by the pain inflicted by the *Œstrus* in depositing her eggs, her ovipositor being represented as constructed like an auger or gimlet, only having several longer points it can wound with more effect. When it is stated, however, that the female *Œstrus Bovis* does not occupy more than a few seconds in depositing each egg, we may fairly doubt whether, with her long, fleshy, tubular ovipositor, she has been able to pierce the hide of an ox; or whether, as Mr. Bracy Clark suggests, she only

* At the present time (April 1851) some of the rein deer in the Gardens of the Society, which were imported last autumn from Lapland, are infected to a remarkable extent with the tumours of this species; there must, I think, be from fifty to a hundred tumours on one of these animals.

makes use of this long instrument to thrust the egg down to the surface of the skin, which she does not pierce, but only glues its eggs to it, the young larvæ when hatched burrowing into the flesh. If this be the case, the act of oviposition must be unattended with pain, as in the case of the deposition of the eggs of *Estrus Equi*, and we must search for the cause of the alarm of the herd, either in an instinctive knowledge that a certain insect flying around them is the parent of a grub which at a future time will be a torment to them, or in the attacks of some other insect; and I confess that I am inclined to consider that Virgil's beautiful description of the annoyance caused by

" Myriads of insects fluttering in the gloom,
(*Estrus* in Greece, *Asilus* named at Rome,)
Fierce and of cruel hum"—

has a *Tabanus* rather than an *Estrus* for its origin.

The larva of the *Estrus Equi* resides beneath the skin of the back of the ox, causing large tumours, and having the extremity of its body constantly placed at the orifice of the wound, where it was introduced as an egg, or introduced itself as a grub, the openings of its respiratory apparatus being placed at that part of the body.

These introductory remarks on the different modes in which insects attack our horses and oxen, and the different effects which they produce, will enable us the better to estimate the effects produced by an insect, or several species of insects, of tropical Africa upon the horses of travellers who have lately returned from that part of the world, where their enterprising researches have been rewarded by the discovery of the great central lake Tchad. Captain Frank Vardon, a gentleman who has travelled far in the interior of Africa, has placed in my hands some fragments of Dipterous insects which attacked his horses, causing the death of one of them. The following is an extract from his note to me in reply to my inquiry as to the mode of its attack:—

"33 Oxford Terrace, Hyde Park, May 1850.

"DEAR SIR,—I had always heard that the fly of South Africa so destructive to cattle was a large gad-fly, the size of a bee or hornet. This is quite erroneous: it is not very much larger than the common house-fly, but a longer and more 'rakish'-looking insect, and easily distinguished by the transverse black bars on its body.

"I fancy it is not met with south of the Tropic of Capricorn. It is usually found on hills, plains being free from it. I have ridden up a hill and found the Sêtsé increasing at every step, till at last forty or fifty would be on my horse at once. The specimens you saw cost me one of the best in my stud. He was stung by some ten or a dozen of them, and died in twenty days. I myself have been bitten by the Sêtsé; you would almost fancy it was a flea biting you. Some parts of South Africa are, I should say, rendered inaccessible by the presence of this pest; I mean of course to a man who travels in the usual way, with his oxen and horses.

"How far the Sêtsé extends in the interior is of course as yet unknown, but I have certain information as to its being 200 miles north

of the 'Great Lake' recently discovered by my friends, Messrs. Livingston, Osswell and Murray.

"Yours faithfully,

"FRANK VARDON."

"J. O. Westwood, Esq."

The various specimens forwarded to me by Captain Vardon have enabled me to determine that the insect is a new species of Wiedemann's genus *Glossina*, which may be thus characterized:—

GLOSSINA MORSITANS, Westw. (Pl. XIX. fig. 1. and details.)

Luteo-albida, thoracis dorso subcastaneo, griseo subtomentoso, vittis quatuor longitudinalibus in medio interruptis nigris, scutelli apice punctis duobus parvis fuscis; abdomine pallide lutescenti, segmento basali utrinque macula parva laterali nigra, singulo segmentorum quatuor proximorum ad basin fascia nigricanti, in medio interrupta, notatis; alis parum infumatis.

Long. corp. lin. 5; expans. alar. lin. $8\frac{1}{2}$.

The head is of a dirty buff colour, narrower than the thorax, with large eyes; the epistoma is paler coloured and clothed with whitish hairs; the proboscis is rather longer than the height of the head; it consists of a slender, horny seta or compound bristle, chestnut-coloured in its chief length, but dilated at the base into a large oval bulbous horny lobe, and upon maceration I was enabled to withdraw from the upper side of the seta (which is consequently grooved), two very delicate styles as long as the proboscis; the sides of this instrument are defended by a pair of elongated, slender setose palpi, as long as the proboscis itself; these are concave on the inside and blackish at the tips, and the setae with which they are clothed are also black, as well as the branched setae with which the arista of the antennæ is furnished; the outer surface of the arista itself, under a powerful microscope, is evidently villose. The antennæ are inserted in a depressed obconic space between the eyes, rounded above, and there are two dark spots on the upper part of the epistoma; the two basal joints of the antennæ are dark in front, and the large third joint is dirty buff-coloured. The thorax is chestnut-red, clothed with a very delicate grey tomentosity and finely punctured; it is impressed across the middle of the dorsum, and is marked with four longitudinal broad black bars, abbreviated in front and behind, the two central ones being longest in front, and the two lateral ones longest behind; the two former are united in front by a black streak from the front margin. The scutellum is dirty buff, with two dark dots at its extremity, from which, as well as from various dark dots at the sides, arise long black setæ; the halteres are nearly white. The wings are slightly stained with dusky; the veins black, except at the base of the wing, where they are dirty-buff. The legs are dirty-buff, with the outside of the thighs stained with dark brown. The last two joints of the tarsi are black, with large pulvilli. The abdomen is flat, oval in outline, and dirty fulvous buff in colour, clothed above with numerous minute

black setæ, which are greatly elongated at the base of the abdomen and the extremity and sides of each segment; the first segment is marked at each side close to the anterior angle with a round black spot, and each of the four following segments has a broad basal fascia of dark brown, interrupted in the middle. The sides and under surface of the thorax are varied with black patches; the abdomen is pale-coloured beneath, with a large terminal oval plate, down the middle of which runs a pale longitudinal line, preceded by two small oblique oval patches, thickly clothed with minute black setæ.

The peculiarities of the genus *Glossina*, whereby it is at once distinguished from *Stomoxys*, to which it is nearly allied, consist in the dilatation of the extremity of the discoidal cell, the rounded horny bulbous base of the proboscis, which is not angulated at its base, and the long and slender flattened palpi, which together form a sheath protecting the proboscis. Wiedemann's typical species (which has remained unique to the present time), *Glossina longipalpis*, (subsequently described by Robineau Desvoidy under the name of *Nemorhina palpalis*.) is a native of Sierra Leone, where it was collected by Afzelius. M. Macquart, judging from the structure of the mouth, considers it probable that it does not live upon the blood of animals, like *Stomoxys*, but upon the nectar of flowers; the two setæ which are enclosed in the proboscis and compose the sucker being so slender, that it is difficult to conceive that they can pierce the skin, the palpi being also elongated so as to form a protection to it, and thus further indicating its weakness. There is however so great a difference between the structure of the proboscis in these insects and *Stomoxys*, that I do not doubt that they are able to pierce the skin of a horse, the proboscis of *Glossina* being a long, straight, horny, needle-like instrument, and not elbowed, with fleshy lips, as is that of *Stomoxys*. Moreover, the bulbous dilated base of the proboscis must evidently play an important part in the economy of the insect, either by giving additional support to the proboscis when in the act of piercing the skin, or by containing powerful muscles for the action of the enclosed setæ; or, as suggested to me by Prof. Owen, this dilated base may be analogous to the dilated base of the sting of the Scorpion, and like it contain a reservoir of some powerfully poisonous liquid.

The account of the irritating powers of the *Glossina* given by Captain Vardon is, it is true, not so detailed as could have been desired, but we learn sufficient to arrive at the conclusion that its effects are, to a certain extent, exactly like those of the *Tabanidae*; how far the attacks may be attended with tumours, similar to those produced by the *Simulium*, and whether a tropical climate may not extend the effects of the attack, producing inflammatory action upon animals perhaps never before in those latitudes, are questions which have yet to be answered. One thing however appears to me evident, that the Sêtsé is no other than the Zimb of Bruce, (an insect respecting whose real family and even existence so many doubts have been expressed,) or at least that that insect is a larger species of *Glossina*, to whose real habits Bruce has added those of a species of *Oestrus*. With the view of establishing this assertion, as well as of clearing up what I

consider the inconsistencies of Bruce's account, I shall beg to introduce his description of the Zimb.

"Nothing was more opposite than the manners and life of the Cushite and of his carrier the shepherd. The mountains of the Cushite and the cities he built afterwards were situated upon a loamy black earth, so that, as soon as the tropical rains began to fall, a wonderful phenomenon deprived him of his cattle. Large swarms of flies appeared wherever that loamy earth was, which made him absolutely dependent in this respect upon the shepherd; but these affected the shepherd also. This insect is called the Zimb * in modern or vulgar Arabic; it has not been described by any naturalist. It is in size very little larger than a bee, of a thicker proportion, and the wings, which are broader than those of a bee, are placed separate, like those of a fly. They are of pure gauze, without colour or spot upon them; the head is large; the upper jaw or lip is sharp, and has at the end of it a strong pointed hair of about a quarter of an inch long; the lower jaw has two of these pointed hairs, and this pencil of hairs, when joined together, makes a resistance to the finger nearly equal to that of a strong hog's bristle; its legs are serrated on the inside, and the whole covered with brown hair or down. As soon as this plague appears and its buzzing is heard, all the cattle forsake their food and run wildly about the plain till they die, worn out with fatigue, fright and hunger. No remedy remains but to leave the black earth and to hasten down to the plains of Atbara, and there they remain whilst the rains last, this cruel enemy never daring to pursue them farther.

"What enables the shepherd to perform the long and toilsome journeys across Africa is the camel, emphatically called by the Arabs the ship of the desert. Though his size is immense, like his strength, and his body covered with a thick skin defended with strong hair, yet still is he not capable to sustain the violent punctures the fly makes with his pointed proboscis. He must lose no time in removing to the sands of Atbara, for when once attacked by this fly, his body, head and legs swell out into large bosses, which break and putrefy to the certain destruction of the creature. Even the elephant and rhinoceros, who, by reason of their enormous bulk and the vast quantity of food and water they daily need, cannot shift to desert and dry places as the season may require, are obliged to roll themselves in mud or mire, which when dry coats them over like armour, and enables them to stand their ground against this winged assassin; yet I have found some of these tubercles upon almost every elephant and rhinoceros that I have seen, and *attribute them to this cause*. All the inhabitants of the sea-coast of Melinda, down to Cape Gardefan, Saba, and the south coast of the Red Sea, are obliged to put themselves in motion and change their habitation to the next sand in the beginning of the rainy season, to prevent all their stock of cattle from being destroyed.

"Of all those that have written upon these countries, the prophet Isaiah alone has given an account of this animal and the manner of

* " See Appendix. It is the same name as Zebul in Hebrew.—E."

its operation (Isaiah, vii. 18, 19) : ‘And it shall come to pass in that day, that the Lord shall hiss for the fly that is in the uttermost part of the rivers of Egypt . . . and they shall come, and shall rest all of them in the desolate valleys, and in the holes of the rocks, and upon all thorns, and upon all bushes.’” (Travels, ii. pp. 314-317.)

“ *Tsalsalya, or Fly.*—We are obliged with the greatest surprise to acknowledge that those huge animals, the elephant, the rhinoceros, the lion and the tiger, inhabiting the same woods, are still vastly this fly’s inferiors ; and that the appearance of this small insect, nay, his very sound, though he is not seen, occasions more trepidation, movement and disorder, both in the human and brute creation, than whole herds of these monstrous animals collected together, though their number was in a tenfold proportion greater than it really is. Providence from the beginning it would seem had fixed its habitation to one species of soil, being a black fat earth, extraordinarily fruitful.

“ We cannot read the history of the plagues which God brought upon Pharaoh by the hands of Moses, without stopping a moment to consider a singularity, a very principal one, which attended the plague of the fly. The land of Goshen, the possession of the Israelites, was a land of promise which was not tilled or sown, because it was not overflowed by the Nile. But the land overflowed by the Nile was the black earth of the Valley of Egypt, and it was here that God confined the flies.—I have magnified him about twice the natural size.—He has no sting, though he seems to me to be rather of the bee kind ; but his motion is more rapid and sudden than that of the bee, and resembles that of the gad-fly in England. There is something particular in the sound or buzzing of this insect. It is a jarring noise, together with a humming, which induces me to believe that it proceeds, at least in part, from a vibration made with the three hairs at his snout.

“ The Chaldee Version is content with calling this animal simply Zebub, which signifies the fly in general as we express it in English. The Arabs call it Arob in their translation, which has the same general signification. The Ethiopic translation calls it Tsal tsalya, which is the true name of this particular fly in Geez, and was the same in Hebrew. The Greeks have called this species of fly Cynomyia, which signifies the dog-fly ; in imitation of which, those I suppose of the church of Alexandria that, after the coming of Frumentius, were correcting the Greek copy and making it conformable to the Septuagint, have called this fly Tsal tsalya Kelb, in answer to the word Cynomyia. Salal in the Hebrew signifies ‘to buzz’ or ‘to hum,’ and as it were alludes to the noise with which the animal terrifies the cattle ; and Tsal tsalya seems to come from this by only doubling the radicals : t’Tsatalou *, in Amharic, signifies ‘to pierce with violence.’”—*Appendix*, vii. 284 *et seq.*

* “ The name of this fly is undoubtedly derived from a word signifying ‘to buzz’ in Hebrew and Ethiopic. The drawing seems to have been made from a preserved subject, an eminent naturalist (the late Prof. Walker) having observed that some of the finer parts are wanting in it. These may have been lost in keeping, or during the drawing of it at home.—EDIT.”

From this account we learn that it is the sound of this insect which produces a great amount of trepidation in the cattle of Abyssinia. This accords with Bracy Clark's ideas of *Œstrus Bovis*. Bruce's description of the position of the wings clearly indicates a Dipterous insect, and his figure shows a bee-like insect, with a long straight porrected proboscis exactly like that of *Glossina*. Bruce adds, that the insect punctures the thick skin of the camel with its proboscis, the parts attacked breaking out into large bosses, which are also occasionally found upon the rhinoceros and elephant. It will be observed however that Bruce merely supposed these tumours to arise from the attack of the Zimb.

I think we have sufficient grounds for believing that Bruce has here jumbled together the notion of the buzzing of the *Œstrus* instilling dread into a herd of cattle, his knowledge of the piercing powers of the proboscis of the Sētscé, and his knowledge of the tumours caused by the presence of the larvæ of *Œstri* under the skin of the camel*, rhinoceros and elephant. The College of Surgeons possesses a specimen of the larva of the *Œstrus* of the rhinoceros, and the camel is also subject to the attacks of a species of the same genus; whilst I consider that Bruce's figure is made up from memory, taking the statement of its resemblance to a bee and its possession of a proboscis together†. No instance, in fact, is known of a species which attacks these animals with its proboscis, forming tumours upon their backs such as are described by Bruce, which agree on the whole with the tumours caused by the larvæ of *Œstrus Bovis*; and we have already seen that no *Œstrus* is capable of inflicting a wound with the organs of the mouth, of which in fact all the known species are destitute, whilst the boring powers of their ovipositors are very questionable.

The accounts given by Mr. R. Gordon Cumming of the destructive powers of the Tsetse fully confirm the opinion here advanced, and prove that although "its bite is certain death to oxen and horses," it causes no dorsal tumours like an *Œstrus*. "This hunter's scourge," he says, "is similar to a fly in Scotland called *Kleg* ‡, but a little smaller; they are very quick and active, and storm a horse like a swarm of bees, alighting on him in hundreds and drinking his blood. The animal thus bitten pines away and dies, at periods varying from a week to three months, according to the extent to which he has been bitten." . . . "The next day one of my steeds died of the 'Tsetse.' The head and body of the poor animal swelled up in a most distressing manner before he died; his eyes were so swollen that he could

* Pliny was aware of the attacks of *Œstri* upon the camel, and he informs us that the merchants of Arabia were in the habit of anointing their camels with whale- and fish-oils. (Hist. Mund. lib. xxxii. p. 302, et lib. xi. cap. 16. p. 36. edit. Pancoucke.)

† It is evident from the note added by the editor of the 8vo edition, from which the above extracts have been made, that the drawing of the insect was not a *bonâ fide* one made on the spot, but was manufactured at home.

‡ *Kleg* is the local name for the *Hæmatopota pluvialis*.

not see, and in darkness he neighed for his comrades who stood feeding beside him *.”

The Marquis di Spineto, in a memoir published “On the Zimb of Bruce as connected with the Hieroglyphics of Egypt †,” endeavoured to ascertain the characters of this insect, and came to the conclusion that it belongs to the order Diptera, notwithstanding Bruce says that it very much resembles the Bee genus, and that it has “several of the properties of the *Bombylius*, the *Tabanus*, the *Oestrus*, and the *Hippobosca*, without belonging to any of them. In some of its generic and even specific characters it is like the *Bombylius* and *Oestrus*, in others like the *Hippobosca* and the *Muscidae*, in a few like the *Tabanus* and the Dog-fly, whilst in the aggregate it differs from every one of these insects.” The Marquis points out the various relationships which the insect, as described by Bruce, presents to these different genera, considering that the porrected hairs or bristles forming the mouth “perform the office of suckers, simply because it does not lay its eggs in the flesh of animals; for according to the account which Bruce gives of the evils attending the attacks of this fly, the bosses which are produced swell, break and putrefy, but never exhibit any larvae or maggots,” thus differing from the habits of the *Oestrus*; to which however he adds, by some curious misconception, that “*the larvae of the Oestrus live in wood, which does not seem to be the case with the Zimb.*”

The Marquis however identifies the Zimb with the *Kυνόμυia* or ‘Dog-fly’ of the Greeks, the ‘Tsal tsalya Kelb’ of the Alexandrian Church, the ‘Af an ouhor’ of the ancient Egyptians, the ‘Arob’ or ‘Oreb’ of Exodus viii. 21, and the ‘Oestrus’ of Aristotle; and considers that it is the precise species of fly which caused the fourth of the plagues of Egypt ‡. As such, he also regards it as the insect represented on the Egyptian monuments at the head of the cartouches which enclose the hieroglyphical titles of the Pharaohs, and as a symbol of Lower Egypt (where only the insect occurs), the preceding figure being intended for a sceptre, in contradiction to the opinion of M. Champollion, who regards the figure of the insect as that of a bee; and consequently the signification of the two symbols as that of “King of an obedient people.” I can by no means however agree with this opinion of the Marquis Spineto, since an examination of various Egyptian monuments in the British Museum and elsewhere (in all of which the insect is represented under precisely the same form) has convinced me that it is intended to represent a Hymenopterous insect, and not one of the Diptera. It is in fact more like the figure of a common Wasp than any other ordinary insect; the

* Five Years of a Hunter’s Life in the Far Interior of South Africa, ii. pp. 220, 227.

† Lond. and Edinb. Phil. Mag. 1834, vol. iv. p. 170.

‡ In the Article “Musquitoe” (Brit. Cyclop. Nat. Hist. iii. 299), I have suggested various reasons for supposing that the fourth plague of Egypt was caused by some species of *Culicidae*, which, although not disproved, are certainly weakened by the knowledge now obtained of the real habits of the *Tsetse* or *Zimb.*

appendages of the head, which are obliquely porrected, are evidently intended for antennæ, and not for a bipartite proboscis; the wings, it is true, are only represented as two in number, but as the two on each side of the body in the Hymenoptera are hooked together, they would, by common observers, be regarded as but one; while the contracted form of the base of the abdomen is precisely that of some of the *Vespidae* figured in the great French work upon Egypt. The *Polistes* represented in pl. 8. fig. 2♂. of that work indeed might almost be considered as the identical species intended to be represented on the monuments.

Mr. S. Birch indeed informs me that there is a coloured representation of this hieroglyphic figure on one of the Egyptian monuments in the British Museum, and that the banded colours of the abdomen leave no doubt that it is intended for a Wasp. Moreover the Egyptian name of this insect was the same as that of Upper Egypt, whilst the preceding figure was intended for a reed as emblematical of Lower Egypt, and consequently the two figures indicated the power of the monarch over both these parts of the empire.

To render this article more complete, I have added descriptions of two more tropical African species of *Glossina*, from the Collection of the Rev. F. W. Hope, together with that of another remarkable hitherto undescribed genus allied to *Glossina*, but distinguished by the very singular recurved proboscis and long styliferous abdomen, also from tropical Africa.

GLOSSINA TACHINOIDES, Westw. (Pl. XIX. fig. 2.)

Cinerea, faciei striga longitudinali media fulva, epistomate argenteo-sericeo, thoracis dorso brunneo-maculato, scutello griseo maculis duabus brunneis punctisque duobus minutis apicalibus nigris, abdominis dorso carneo-griseo segmento singulo maculis duabus maximis fuscis, pedibus luteo-albidis, tarsis supra nigris.

Long. corp. lin. 4; expans. alar. lin. 8½.

Hab. in Africa occidentali tropicali. (Mus. D. Hope.)

This species is smaller than the preceding and differently coloured. The terminal joint of the antennæ is more lunate in form and dusky coloured in front; the palpi are dusky coloured at the tip and clothed with black hairs. The upper surface of the thorax is ash-coloured, divided across the middle by an impressed line; the anterior half is marked on each side towards the fore angles with an oval brown spot, extending laterally and backwards into a lunate line, enclosing a smaller oval spot on each side towards the hinder angles; in the middle are two slender abbreviated brown lines, and two minute spots resting upon the transverse impressed line over which they are extended and dilated into a pair of somewhat larger spots in the middle of the upper surface of the thorax, each with a slender transverse line extending from it to the sides of the thorax, where it meets a curved lateral brown line enclosing a fainter oval spot, the hind extremity of each of which nearly joins, at the hinder angles of the back of the thorax, a straight line running forwards into the disk, where it vanishes.

The upper side of the abdomen may be described as of a brown colour, with the lateral and posterior edges and an ill-defined longitudinal central band of fleshy ash: it is thickly clothed with minute black hairs on the disk, and with long ones at the base and sides. The wings and their veins are coloured as in *Gl. morsitans*.

GLOSSINA TABANIFORMIS, Westw. (Pl. XIX. fig. 3.)

Griseo-fusca epistomate sericeo, thorace fusco-maculato, abdomine fusco-rufescenti apice sensim obfuscato, pedibus fuso-luteis tibiis tarsisque nigro lineatis alis fuso infumatis.

Long. corp. lin. 6; expans. alar. lin. 13 $\frac{1}{2}$.

Hab. apud littus aureum Africæ tropicalis occidentalis. (Mus. D. Hope.)

This species is very much larger than either of the preceding. The head is comparatively much smaller and the wings much larger; the front of the head is dusky; it, as well as the basal joints of the antennæ, is rather thickly clothed with black hairs; the arista of the antennæ is luteous, with a dark line behind, and the branding setæ with which it is furnished are black; the palpi are thickly clothed externally with short black setæ; the thorax is dark greyish brown, also very thickly clothed with short black setæ and long curved lateral bristles; the back of the thorax is marked with a dark central longitudinal line, having a less distinct one on each side of it, between which and each side are two large brown spots, one behind the other; the scutellum is paler, and marked with two ill-defined dusky spots; the wings are stained brown; the legs are dirty luteous buff; the tibiæ marked with one, and the tarsi with three very delicate longitudinal black lines; the tibiæ are compressed, and the black line occupies the superior compressed ridge.

Tribe MYOPARIÆ, Macquart, Hist. Nat. Ins. Dipt. ii. 29.

Genus STYLOMYIA, Westw. (*Stylogaster*, Wlk. nec Macq.)

Corpus subelongatum capite thorace parum latiori, facie antice dimidio supero carinato, dimidio infero valde concavo. Antennæ porrectæ articulo basali minimo, 2do obconico, 3to subovali præcedentis longitudine, vel præcedenti multo longiori compresso parum curvato, arista versus apicem marginis superi inserta, porrecta. Haustellum capite et thorace conjunctim triplo longius, porrectum, in medio geniculatum, dimidio basali parum deflexo et ad ejus apicem crassiori, dimidio apicali valde incurvato. Thorax brevis quadratus. Abdomen supra subcon vexum parum curvatum, apice pone segmentum 5um in stylum elongatum (longitudine quinque articulorum præcedentium aequalem), deflexum valde angustum, contracto, hujus stylus apice supero in uno sexu, oblique truncato; seta elongata supra hirsuta, lobo breviori compresso filamentisque duobus elongatis simplicibus in cavitate truncata insidentibus. Alæ breves cellula 1ma postica clausa pediculata et postice dilatata, vena obliqua cellulam postice contiguam claudente sub-

obsoleta; cellula anali brevissima rix pone pseudalulam extensa rena brevissima transversa clausa. Pedes elongati gravissimi, calcaribus duobus tibiarum parum elongatis, tibiis posticis difformibus, unguibus pulvillisque minutissimis.

This genus is very close to the American genus *Stylogaster*, but especially differs from the description given thereof by M. Macquart, in the very minute condition of the anal cell of the wings. The form of the head and the unequal division of the haustellum, as represented in M. Macquart's pl. 13. fig. 15, are also characters at variance with those of the insects of which I have composed the present genus. The anal cell is of small size in *Stachynia*, Mcq. (*Dalmannia*, Rob. D.), but it is still more minute in *Styloomyia*. The long slender legs and minute claws and pulvilli are also unlike those of all the other *Myopariæ*.

STYLOMYIA LEONUM, Westw. (Pl. XIX. fig. 4, and details.)

Rufo-fulva, facie argenteo-sericea antennis rufo-fulvis arista nigra, vertice subplano macula ovali nigra ocellos postice includente, haustello nigro basi subtus parum pallidiori, thorace scutello abdomineque rufo-fulvis stylo concolori fascia lata fere apicali nigra, pedibus fulvis tarsis apice fuscis, tibiis duabus posticis dimidio basali fusco, apicali albido; tarsis nigris.

Long. corp. lin., stylo excluso, 4; expans. alar. lin. 6.

Hab. in Sierra Leonæ, Africæ. (In Mus. D. Hope.)

The facets of the middle portion of the inner margin of the eyes are rather larger than the posterior ones. The wings are but slightly tinged with grey, and the veins are blackish. The extremity of the anal style with its filaments are fulvous coloured. The two posterior tibiæ are very slender at the base; the apical half is dilated on the upper edge, the under edge not being quite straight.—*Note.* All the details are taken from the species figured.

STYLOMYIA CONFUSA, Westw. *Fulva, facie argentea, vertice omnino nigro; antennis fulvis articulo 3to antennarum longitudinem 2di vix superanti, ovali-conico, arista nigra; tuberculo antennifero pallide fulvo, haustello nigro basi fulvo; thorace supra nigro marginibus lateralibus angulisque anticis distinete et irregulariter luteis setis longis nigris. Scutello fisco setis duabus longis terminalibus nigris, pedibus quatuor anticis omnino luteo-albidis tibiis apice obscuris, femoribus duobus posticis fascia angusta ante alteraque pone medium fuscis; tibiis dimidio basali fusco fascia lata media alba, tertia parte apicali fusco, tarsis fuscis; abdomine fulvo segmentis 2do—5to margine postico tenui obscuro; stylis dimidio basali fulvo-rufo; apicali nigro, genitalibus exsertis fulvo-rufis; corpore subtus fulvo-albido. Praecedenti e tertia parte minor.*

Hab. —? (In Mus. Brit.)

Although in general form and proportion of its parts, especially of the terminal style of its abdomen, the specimen of this species in the British Museum agrees exactly with *St. Leonum*, yet the short third

joint of the antennæ, and the extraordinarily enlarged size of the middle facets of the inner margin of the eyes, might indicate it to be the opposite sex of the preceding. The second segment of the abdomen is furnished on each side with a small fascicle of elongated black hairs.

This species is introduced by Mr. F. Walker into his 'List of the Dipterous Insects in the Collection of the British Museum' (part iii. p. 680), under the name of *Stylogaster stylatus*; but it appears to me that it neither accords with Macquart's generic characters of *Stylogaster*, nor with the concise Fabrician specific description of *Conops stylata* (Syst. Antl. 177), nor yet with Wiedemann's more detailed observations, especially with reference to the sexual difference in the form of the antennæ (Auss. Eur. Z. Ins. ii. 245).

DESCRIPTION OF THE FIGURES.

(*ANNULOSA*, Pl. XIX.)

Fig. 1. *Glossina morsitans*, magnified. 1a, the head seen in front with the haustellum removed; 1b, the head seen sideways, the tips of the parts of the haustellum removed; 1c, the lower part of the head, with the parts of the haustellum separated and the hirsute palpi removed; 1d, the underside of the extremity of the head and the bulb seen beneath, showing the bulbous base of the haustellum; 1e, antenna greatly magnified, showing the villose anterior edge of the arista and the hirsute hairs with which it is furnished; 1f, the terminal joint of the tarsus, showing the strong unguis and the large setose pulvilli.

Fig. 2. *Glossina tachinoides* magnified.

Fig. 3. *Glossina tabaniformis* magnified.

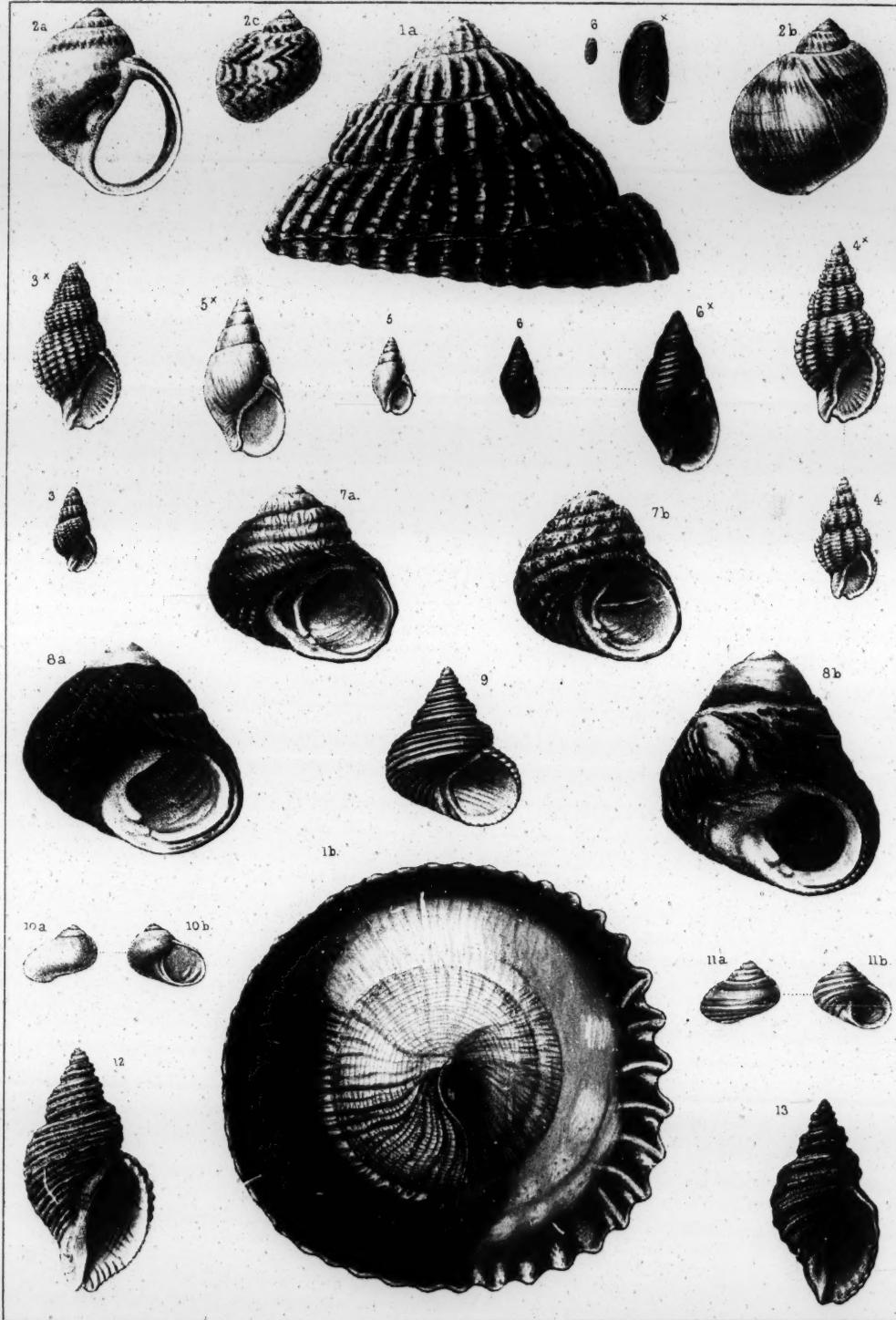
Fig. 4. *Stylomyia leonum* magnified. 4a, the head and haustellum seen sideways; 4b, antenna; 4c, abdomen seen sideways; 4d and 4e, extremity of the abdomen with its appendages; 4f, hind leg; 4g, unguis and pulvilli.

3. ON THE MARINE MOLLUSCA DISCOVERED DURING THE VOYAGES OF THE HERALD AND PANDORA, BY CAPT. KELLETT, R.N., AND LIEUT. WOOD, R.N. BY PROFESSOR EDWARD FORBES, F.R.S. ETC.

(*Mollusca*, Pl. IX. & XI.)

Out of 307 species of shells collected by the voyagers, 217 are marine Gasteropoda, 1 is a Cephalopod, and 58 marine bivalves. The genera of which species are most numerous are—*Murex*, *Purpura*, *Trochus*, *Terebra*, *Strombus*, *Conus*, *Columbella*, *Littorina*, *Oliva*, *Cypræa*, *Natica*, *Patella*, *Chiton*, *Venus*, and *Area*. Among the more local genera represented in this collection are, *Monoceros*, *Pseudoliva*, *Cyrtulus*, *Saxidomus*, and *Crassatella*. The specimens are usually in very fine preservation. Many of the species are rare or local.

The localities at which they were chiefly collected were the coast of southern California, from San Diego to Magdalena, and the shores of Mazatlan. Unfortunately the precise locality of many of the individual specimens had not been noted at the time, and a quantity of Polynesian shells, mingled with them, have tended to render the value of



W. H. Baily.

Printed by Hullmandel & Walton.

Fig. 1. *Trochita spirata*. Forbes
 2. *Natica Pritchardi* "
 3. *Nafsa Woodwardi* "
 4. *N. Cooperi* "
 5. *Planaxis pigra* "
 6. *P. nigratella* "

Fig. 7. *Trochus aureoextinctus* Forbes
 8. *T. Gallina*
 9. *T. castaneus* Nottall.
 10. *T. Hillii* Forbes
 11. *T. purpuratus* "
 12. *Purpura analoga* "
 13. *P. fuscata* "



the collection as illustrative of distribution less exact than it might have been. A few specimens of considerable interest were taken by the 'Herald' at Cape Krusenstern. The new species are all from the American shores. There are no products of deep-sea dredging.

As many of the following new forms are from the coast of Mazatlan, Mr. Cuming, whose experience and advice has been taken, and magnificent collection consulted in drawing up this report, has considered it desirable that some undescribed shells contained in his collection, from that region, should be described and figured at the same time.

TROCHITA SPIRATA, sp. nov. (Pl. XI. fig. 1.)

T. testa conicā, fusco-purpurea, longitudinaliter radiato-sulcata, sulcis numerosis, prominentibus, subrugosis; anfractibus 6, angustis; lamina internd spirali, depresso, magnā, margine undulato.

Diam. $2\frac{3}{10}$, alt. $1\frac{4}{10}$ unc.

A very handsome species of this group, allied to *Calyptrea soridula* of Broderip, and differing from the well-known *T. trochiformis* in having very much narrower and more numerous whorls, as well as in its internal colouring. It was procured at Massaniello, in the Gulf of California.

TROCHUS CASTANEUS. Nuttall, MSS. (Pl. XI. fig. 9.)

T. testa late-conicā, crassā, lāte castaneā, spiraliter flavo-lineata, anfractibus 6, convexiusculis, omnibus spiraliter sulcatis, sulcis numerosis, ultimo lato, basi subangulato, convezo, imperforato, apertura subquadrata, margaritacea, suturis impressis. Operculum?

Alt. $\frac{8}{10}$, lat. $\frac{8}{10}$, long. apert. $\frac{4}{10}$ unc.

The number of sulcations in the second whorl is about six; the cavities are always rich chestnut, the elevations yellowish. The general form is intermediate between that of *ziziphinus* and *alabastrites*. The shell has long been known under Nuttall's manuscript name, but never, so far as I am aware, described. It is from Upper California.

TROCHUS (MONODONTA) GALLINA, sp. nov. (Pl. XI. fig. 8.)

T. testa obtuse pyramidalis, crassā (adultus ponderosus), spirā magnā, anfractibus 5, glabris, obsoletē obliquē striatis, convexiusculis, albidis, fasciis angustis numerosis purpureis ornatis, anfractu ultimo prope suturam subcanaliculato, basi lateribus rotundatis, umbilico albo, imperforato, impresso, apertura subquadrata, labro externo subpatulo, margine acuto, lāvi, nigrescente, labro columellari bidentato, albo, faucibus margaritaceo-albis, operculo circulari, corneo, fusco, spiris numerosissimis, confertis. Testa junior spirā depresso-angulata.

Alt. $1\frac{1}{10}$, lat. max. $1\frac{2}{10}$, alt. apert. $0\frac{6}{10}$ unc.

Probably from the Mazatlan coast.

TROCHUS (MONODONTA) AUREO-TINCTUS, sp. nov.

(Pl. XI. fig. 7.)

T. testa obtuse pyramidalis, crassā, spirā mediocri, anfractibus 4 vel

5, convexiusculis, obtusè angulutis, subcanaliculatis, spiraliter 1-2 latè sulcatis, striis spiralibus minutis, longitudinalibus minutissimis sculptis, colore nigro obscurè minutissimèque griseo-lineato, ultimo anfractu basi subplanato 4-5 sulcis profundis spiralibus sculpto, margine obtusè subangulato, umbilico profundè perforato, lètè aurantio, aperturā subrotundā, labro externo tenui, nigro marginato, labro columellari albo 1-2-dentato, dentibus inæqualibus munitis, dente inferiore minimo, fauce albo-margaritaceo.

Alt. $0\frac{7}{10}$, lat. max. 1, alt. apert. $0\frac{4}{10}$ unc.

Variat costis obliquis transversis.

With the last

TROCHUS (MARGARITA) PURPURATUS, sp. nov.

(Pl. XI. fig. 11.)

T. testa turbinata, spiræ depressa, prominulæ, anfractibus 5, convexiusculis, nitidis, lèvatis, striis incrementi minutissimis, roseolis fasciis spiralibus lète purpureis cinctis, suturis impressis, basi margine subrotundato, umbilico imperforato, albo, aperturā subrotundâ, labro externo tenui, labro interno lèvi, obsoletè undulato, albo-margaritaceo, faucibus purpureo-margaritaceis.

Alt. $0\frac{4}{12}$, lat. max. $0\frac{5}{12}$, alt. apert. $0\frac{2}{10}$ unc.

A beautiful little species. W. coast of N. America?

TROCHUS (MARGARITA) HILLII, sp. nov. (Pl. XI. fig. 10.)

T. testa latè turbinata, heliciformi, spiræ obtusa, parva, depressa, anfractibus 5 convexiusculis, lèvatis, politis, ad suturas appressis, flaveo-albidis, ultimo anfractu maximo, basi convexo, marginibus rotundatis, centraliter excavato, imperforato, aperturā obliquè subrotunda, labro externo tenui, columellari leviter arcuato, albo; faucibus albo-margaritaceis.

Alt. $0\frac{4}{12}$, lat. max. $0\frac{5}{12}$, alt. apert. $0\frac{3}{12}$ unc.

From the northern shores of the W. coast of N. America?

I have dedicated this species to — Hill, Esq., Master of the 'Herald.'

NATICA PRITCHARDI, sp. nov. (Pl. XI. fig. 2.)

N. testa subglobosa, spiræ brevi, anfractibus 5, nitidis, sub lente striatis, flaveolis, fasciis transversis fusco-purpureis, angulato-undulatis flammulatis, in adulto obsoletis seu fasciis obscuras spirales simulantibus; aperturâ ovatâ, supernè obsoletè angulata, columella costâ callosâ albâ spirali in umbilicum obliquè intrante, umbilico supernè perforato; faucibus fasciato-fuscatis. Operculo calcareo, albo, lèvi, polito, sulco angustissimo prope margine externo, margine interno recto, crenulato.

Alt. 1 unc. ; long. anfr. ult. $\frac{9}{10}$, lat. $\frac{9}{10}$ unc. ; long. apert. $\frac{8}{10}$ unc. Mazatlan. I have dedicated this pretty shell, which reminds us of the Atlantic *intricata*, to my friend Dr. Pritchard, Assistant-Surgeon of H.M.S. Calypso, who assiduously collected on the coast of Mazatlan, where he, as well as the officers of the 'Herald' and 'Pandora,' met with this species in abundance.

Fig. 2 c. represents the young shell.

PLANAXIS NIGRITELLA, sp. nov. (Pl. XI. fig. 6.)

P. testa ovato-lanceolata, crassiuscula, fusco-nigrida, spirae brevi, acutae, anfractibus 6, spiraliter sulcatis, interstitiis latis, planis, sulcis in medio anfractus ultimi obsoletis, aperturam ovatam, patulam, superne unidentata, labro externo tenui, margine interno obsoletè crenulato, labro columellari, superne striato, inferne abbreviato, laevi; canali brevissima, fauibus atropurpureis.

Long. $\frac{5}{12}$, lat. $\frac{3}{12}$, long. apert. $\frac{3}{12}$ unc.

Straits of Juan del Fuaco. The operculum is preserved in some of the numerous specimens, and has a subspiral nucleus (see fig. 6 a).

PLANAXIS PIGRA, sp. nov. (Pl. XI. fig. 5.)

P. testa ovato-lanceolata, crassa, flaveola, spirae mediocri, acutae, anfractibus 6, planatis, levigatis, aperturam brevè-ovatam, patulam, superne obsoletè unidentata, labris incrassatis, marginibus levibus, canali brevissima, fauibus albis.

Long. $\frac{4}{12}$, lat. $\frac{2}{12}$, long. apert. $\frac{2}{12}$ unc.

Its surface is invested with a soft yellow epidermis. The operculum is corneous, of subconcentric elements, with a lateral subspiral nucleus.

Pitcairn's Island.

NASSA COOPERI, sp. nov. (Pl. XI. fig. 4.)

N. testa lanceolata, turrita, crassa, anfractibus 6, convexiusculis, spiraliter sulcato-striatis, longitudinaliter 8-costata; costis distantibus, fortibus, distinctis; anfractu ultimo $\frac{1}{2}$ longitudinis testae aequante, aperturam ovatam, canali brevi; labro externo crasso, simplici; labro columellari reflexo, albo; cauda alba; anfractibus fuscis, obscurè albo-fasciatis.

Long. $\frac{8}{12}$ unc., lat. anfr. ult. $\frac{4}{12}$, long. apert. $\frac{3}{12}$.

Marked from the Sandwich Isles. Dedicated to Lieut. Cooper, R.N., of the 'Herald.'

NASSA WOODWARDI, sp. nov. (Pl. XI. fig. 3.)

N. testa lanceolata, turrita, crassa, alba, rufo-fasciata, anfractibus sex convexiusculis, spiraliter sulcatis, longitudinaliter densè costatis, spirae vix longitudinali ultimi anfractus aequante; aperturam ovatam, cauda brevissima; labro columellari reflexa, alba; cauda albâ; fauce striato.

Long. $\frac{5}{12}$ unc.; lat. $\frac{2}{10}$ unc.; long. apert. $\frac{2}{12}$ unc.

With the last. Dedicated to — Woodward, Esq., R.N., Purser to the 'Herald.'

PURPURA ANALOGA, sp. nov. (Pl. XI. fig. 12.)

P. testa turrita, albida, spiraliter latè rufo-fasciata; spirae exsertae; anfractibus 5 rotundatis, costis spiralibus (6 ad 8 in anfractu penultimo), quadratis, numerosis cinctis, interstitiis crenulatis, ad suturam obsoletis, labro subdenticulato.

Long. $1\frac{4}{12}$, lat. $\frac{8}{12}$, long. apert. $\frac{8}{12}$ unc.

This species (from the Californian coast?) bears a striking resemblance to the Atlantic *Purpura lapillus*, and is intermediate between No. CCXVIII.—PROCEEDINGS OF THE ZOOLOGICAL SOCIETY.

it and the *Purpura decemcostata* of Middendorff, from the Icy Sea at Behring's Straits, the place of which it probably takes on the western shores of North America.

Purpura, nov. sp.? A single specimen, to which I abstain giving a name, since its characters are intermediate between those of *decemcostata* and *Freycinetii* (a Kamtschatka shell); it is probably a variety of the former.

PURPURA FUSCATA, sp. nov. (Pl. XI. fig. 13.)

P. testa oblonga, subturrata, fuscata; spirae brevi; anfractibus convexis, costis spiralibus (2 in anfractu penultimo) paucis distan- tibus subsquamosis cinctis, interstitiis costis obsoletis; apertura dilatata, columella albida.

Long. $1\frac{1}{2}$, lat. $\frac{8}{12}$, long. apert. $\frac{8}{12}$ unc.

A species of the *Lapillus* group. Said to have been taken at the Sandwich Islands.

Among the *Purpurae* in the collection are *P. planospira*, *P. columellaris*, and *P. Carolensis*, all Galapagos species, and probably collected during the visit to those islands.

FUSUS KELLETII, sp. nov. (Pl. IX. fig. 10.)

F. testa crassata, fusiformi, pyramidata, anfractibus 9, spiraliter striatis, angulatis, noduloso-costatis, costis in anfractibus omnibus 8, prope suturam obsoletis excavatis appressisque; anfractu ultimo $\frac{2}{3}$ testae occupante; apertura elongato-pyriformi, superna angulata; inferna canali obliquo plus $\frac{1}{3}$ apertura aequante; labro columellari, reflexo, incrassato, labro externo attenuato, subdenticulato; cauda incrassata, contorta, reflexa; colore sordide albido, ore albo.

Long. $3\frac{1}{2}$ unc.; lat. max. anfr. ult. $1\frac{2}{10}$ unc.; long. apert. $2\frac{3}{4}$ unc.; long. caud. $\frac{9}{10}$.

This remarkable shell was taken on the Californian coast, and is very distinct from any known *Fusus*. In general aspect it closely resembles a *Fasciolaria*, reminding us strongly of the European *Fasciolaria tarentina*, but is greatly larger and has no plaits on the pillar lip. The striae which wind round the whorls are grouped in twos and threes. They become very strongly marked and assume the character of sulcations on the caudal portion of the body whorl. The ribs are mainly developed a little above the centre on the angulated portion of the body whorl and on the lower halves of the upper whorls, so prominently as to appear like large tubercles.

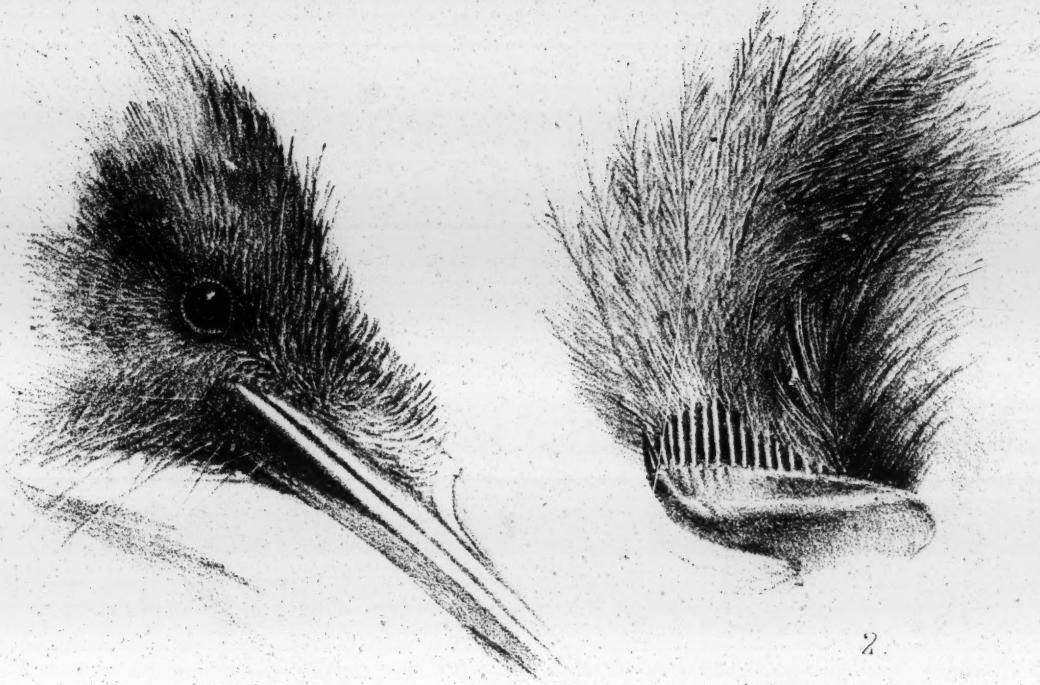
I have dedicated this unique shell to the eminent conductor of this important expedition.

Fusus Oregonensis was taken on the Californian coast, and *F. sale- brosus* on the coast of Mazatlan.

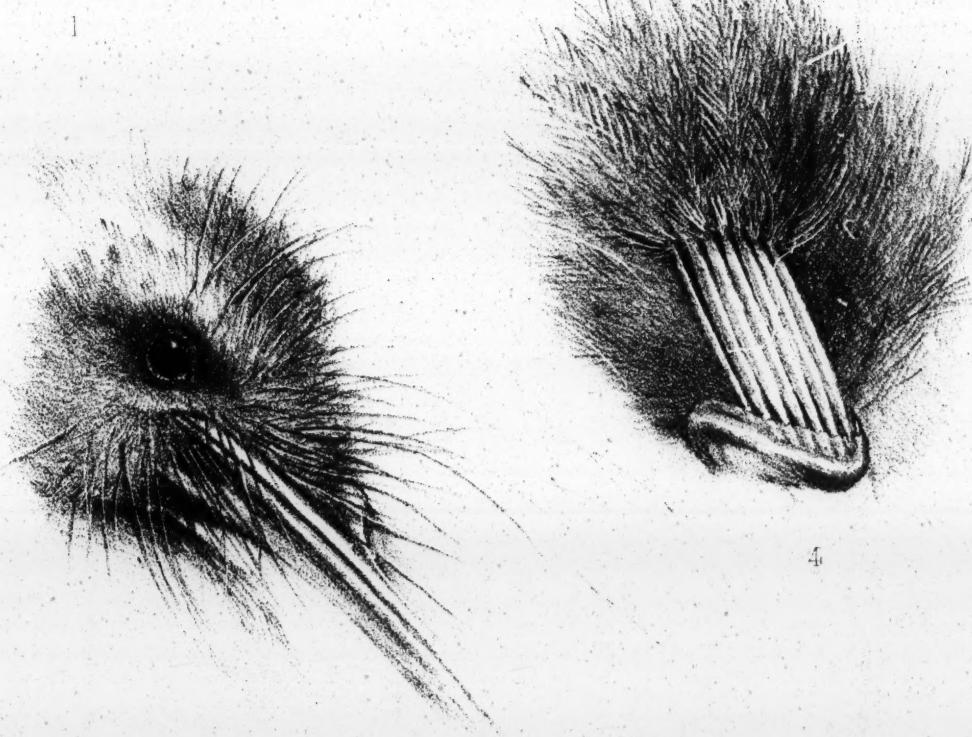
4. ON THE GENUS APTERYX. BY A. D. BARTLETT.

(Aves, Pl. XXX. XXXI.)

In calling the attention of the Meeting this evening to the large collection of specimens of the genus *Apteryx* on the table, I beg to state that I have been led to make a careful examination of all the



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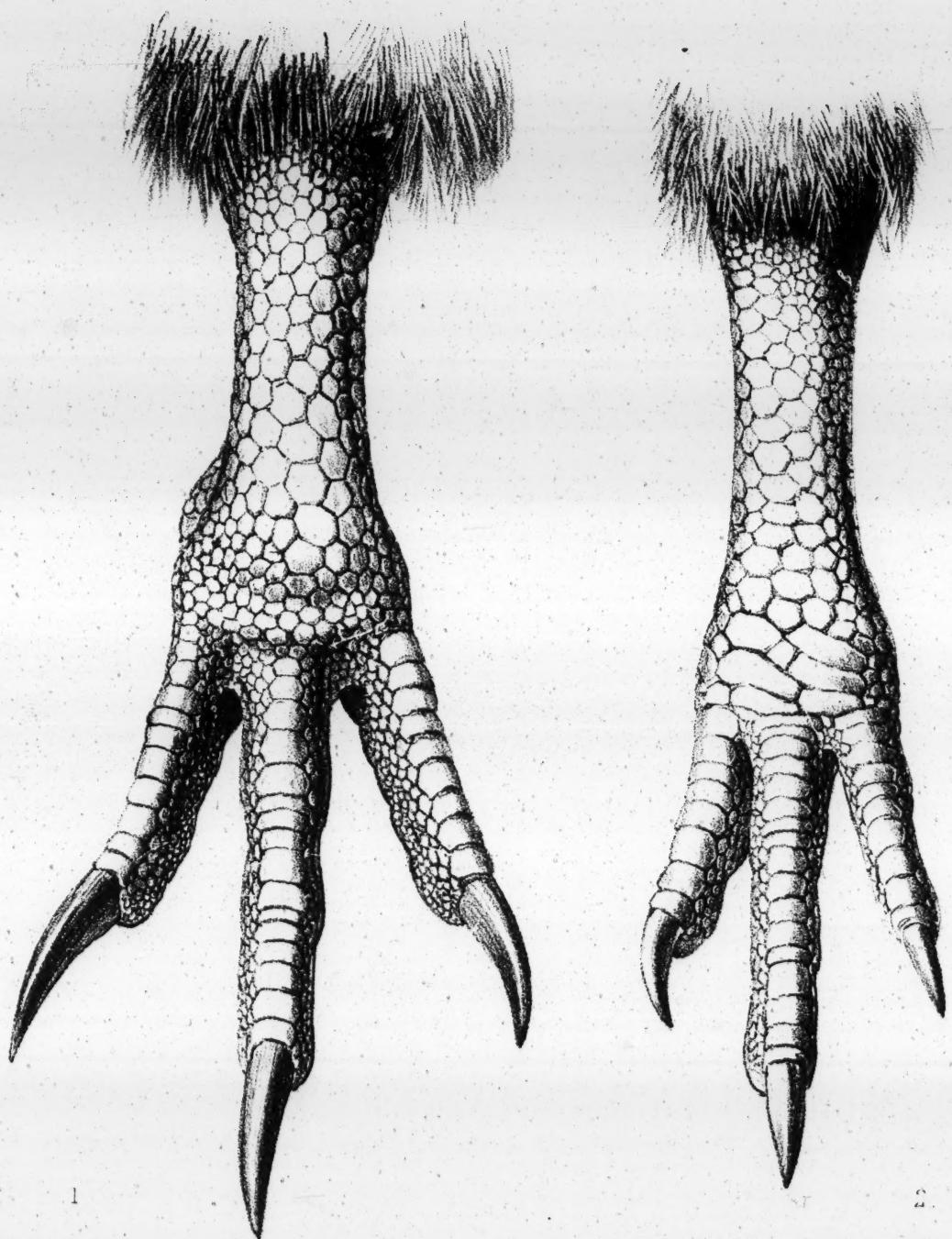
Wolf, lith.

M. & N. Hanhart, Imp.

1. 2. APTERYX AUSTRALIS. 3. 4. A. MANTELLI.



18



Wolf. lith.

M. & H. Hanhart, Imp'

1. APTERYX AUSTRALIS. — 2. A. MANTELLI.



individuals I could find in the Collections of the British Museum, the Museums of the Zoological Society, the Royal College of Surgeons, and elsewhere, in consequence of an *Apteryx* belonging to Dr. Mantell having been placed in my hands by that gentleman a few days since, which appeared to me to differ from all that I had before seen. As a careful comparison of this bird with the specimens in the collections before mentioned fully justified me in considering it as a distinct species, I was about to describe it as a new one; but most fortunately, I heard that the original specimen figured and described by Dr. Shaw (to which he applied the name *Apteryx Australis*) was in the collection of the Earl of Derby at Knowsley. It is with much pleasure I have to acknowledge the kindness of his lordship in honouring me with the loan of this bird, which has enabled me to identify the large *Apteryx* placed in my hands by Dr. Mantell as belonging to this species, and also to determine most satisfactorily the distinctive characters of the common species, which is considerably smaller, and to which the name of *Apteryx Australis* has long been erroneously applied. This bird differs from the original *Apteryx Australis* of Dr. Shaw in its smaller size, its darker and more rufous colour, its *longer tarsus which is scutulated in front*, its shorter toes and claws, which are dark horn-coloured, its smaller wings, which have much stronger and thicker quills, and also in having long straggling hairs on the face. I may however remark, that although individuals of this species differ much in size, depending probably on age, sex, &c., I have found no exception to the distinctive characters above given. I therefore propose the name of *Apteryx Mantelli* for this smaller and more common species,—a humble effort to commemorate the exertions of Walter Mantell, Esq., to whom we are indebted for so many valuable discoveries in the natural history of New Zealand.

I subjoin a short description of the two species, together with figures of their legs and wings, in order that they may be more readily distinguished.

APTERYX AUSTRALIS.

Colour pale greyish-brown, darkest on the back.
 Entire length 30 inches*.
 Bill from forehead . . . 6 "
 Tarsus (reticulated) . . . $2\frac{1}{2}$ "
 Middle toe and claw $3\frac{5}{8}$ "
 Claws nearly equal in length, and white.
 Wings with soft slender quills; face with short hairs.

APTERYX MANTELLI.

Colour dark rufous brown, darkest on the back.
 Entire length 23 inches*.
 Bill from forehead . . . 4 "
 Tarsus (scutulated) . . . $2\frac{3}{4}$ "
 Middle toe and claw $2\frac{1}{2}$ "
 Middle claw longest, all the claws dark horn-colour.
 Wings with strong thick quills; face with long straggling hairs.

In conclusion, I would remark that the specimen of *Apteryx Australis* belonging to Dr. Mantell was collected by his son in Dusky

* The entire length, being taken from skins, I consider of little value; the entire length of a bird ought always to be taken before the bird is skinned.

Bay; and I have been informed by J. E. Gray, Esq., that the original bird described by Dr. Shaw was brought from the same locality. As far as I am able to ascertain, all the specimens of *Apteryx Mantelli* are from the North Island.

5. NOTE UPON *BUCEROS GINGINIANUS*. BY LIEUT. HARDY, IN A LETTER TO COLONEL SYKES, F.R.S., F.Z.S. ETC. COMMUNICATED BY COLONEL SYKES.

MY DEAR COLONEL,—I was out shooting one day beyond Pahlunpore, when a dull slate-coloured bird, about the size and figure of a magpie, flew past me; my beaters roared out to me to fire at it, but I let it go by. They made however such a fuss about it, and had marked it down on a tree, that I went after it and to their great delight shot it. They then told me that it was very valuable to them; that they would chop up the flesh, pickle and preserve it in a bottle, and sell it as a medicine to alleviate the pangs of childbirth, for which it was highly prized. In the course of the day two sepoys came to my tent and begged to have the bird, as they had been sent out by the Mewab expressly to shoot one, but had been out two days without success. They call it "Seerōtra." None of my brother officers had ever seen or heard of it before. I kept the beak, and the other day turned it out with some other little trophies, and had it put together; if you will keep it as a little sporting tribute to my father's friend, I shall be very proud.

Sincerely yours,

EDMUND HARDY.

6. NOTE UPON *TURDUS VULPINUS*, HARTL. BY DR. HARTLAUB.

(Aves, Pl. XXXII.)

In presenting the accompanying figure of my *Turdus vulpinus*, from Caracas, I have little to add to the description of it in the *Revue et Magasin de Zoologie*, 1849, p. 276. The only specimen I ever saw of this bird is in the Hamburg Museum. It is certainly a very aberrant species of *Turdus* and its American divisions, and would consequently justify a subgeneric separation, which however I leave to another.

7. ON NEW AUSTRALIAN BIRDS IN THE COLLECTION OF THE ZOOLOGICAL SOCIETY OF LONDON. BY JOHN GOULD, F.R.S. ETC.

(Aves, Pl. XXXIII. XXXIV.)

The first three species which I am about to describe in the present communication formed part of a collection presented to the Zoological Society of London by the late Captain Owen Stanley, R.N., whose

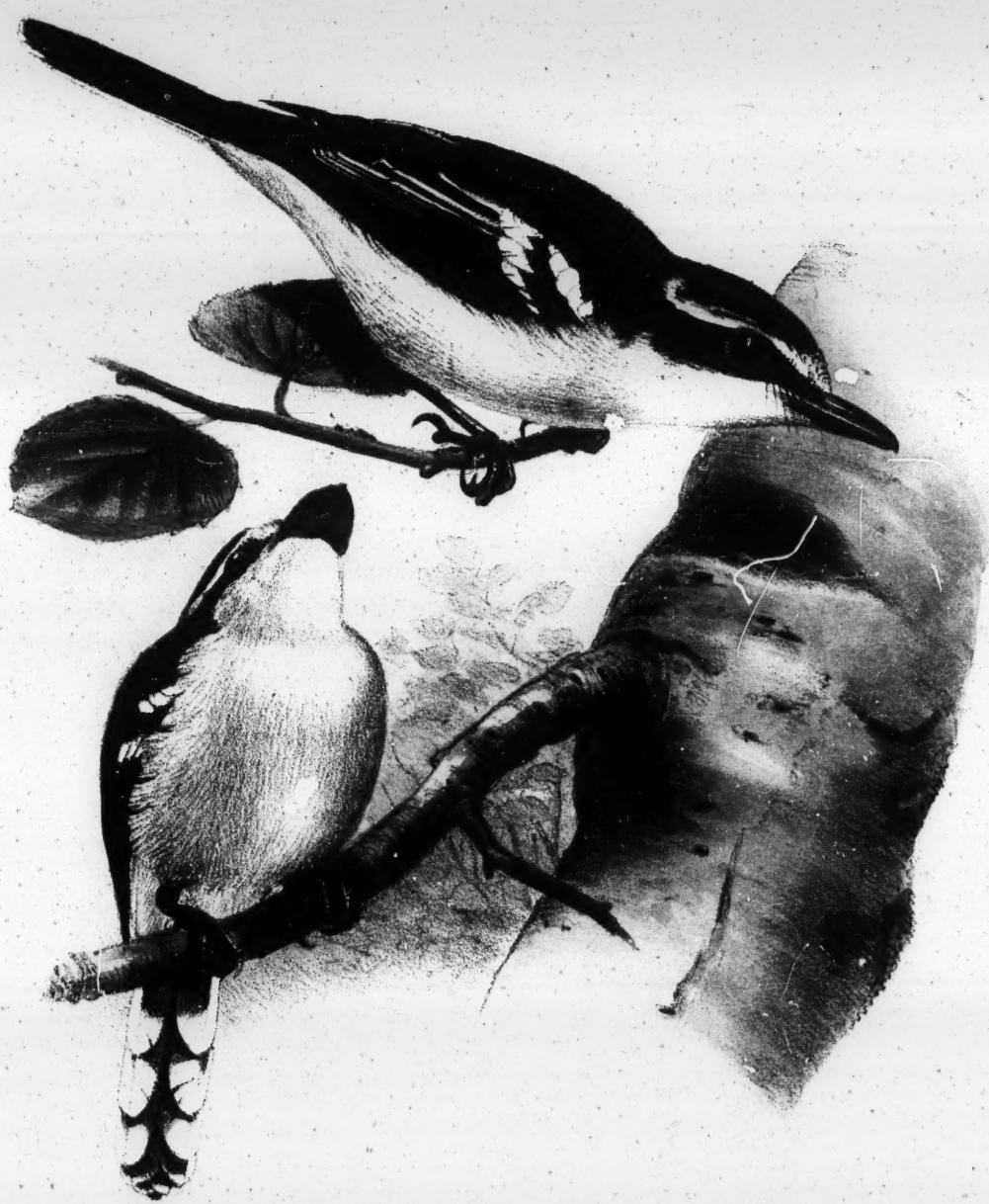


M. & N. Hanhart, Imp^t.

771 F. lith.

TURDUS VULPINUS, Hartlaub.

Proc. Z. S. Aves XXXIII



Wolf, lith.

M. & N. Hanhart imp^r

MACHÆRIRHYNCHUS FLAVIVENTER *Gould*.

untimely death is a real cause of regret to every one who is interested in the sciences which he cultivated with equal ardour and success.

The collection in question was remarkable for the extreme beauty of the preparations, as well as for the rarity and interest of the species of which it was chiefly composed.

MALURUS AMABILIS.

Male: Head, ear-coverts and centre of the back delicate violet-blue; lores, throat, breast, crescent across the upper part of the back and the rump deep bluish black; scapularies chestnut; wings brown, the secondaries slightly margined with white; abdomen white, very slightly tinged with buff on the flanks; tail dull greenish blue, the four lateral feathers margined externally and largely tipped with white; bill black; irides and feet dark brown.

Total length, $5\frac{1}{2}$ inches; bill, $\frac{1}{2}$; wing, 2; tail, $2\frac{3}{4}$; tarsi, $\frac{7}{8}$.

Hab. Cape York, Northern Australia.

Remark.—This species is nearly allied to *Malurus Lamberti*, *M. elegans*, and *M. pulcherrimus*, but differs from them all in having the lateral tail-feathers distinctly margined and tipped with white, and in having a lighter-coloured abdomen. I consider it to be the most beautiful species of the genus yet discovered; the only example I have seen is in the collection of this Society.

Family **MUSCIPIDÆ?**

Genus **MACHÆRIRHYNCHUS.**

Gen. Char.—Bill rather shorter than the head, very much depressed and widely dilated, causing it to assume a lancet-like form; culmen elevated, forming a distinct ridge down the centre of the upper mandible, and continued over its extremity in the form of a sharp hook; under mandible convex; tomiæ straight, the upper very slightly overlapping the lower; rictus beset with fine but stiff bristles; nostrils oblong, partly covered with an operculum, and seated in large and deep depressions occupying the basal half of the upper mandible; wings short and somewhat rounded, the first quill very short, the second much shorter than the third, the fifth the longest; tail moderate in length, distinctly graduated, the outer feather being little more than half the length of the central ones; tarsi moderate in length and slight in structure; toes feeble, particularly the anterior ones; the two outer toes equal in length, and united from the base to the first joint; hind toe rather long; claws hooked and very sharp.

MACHÆRIRHYNCHUS FLAVIVENTER. (Aves, Pl. XXXIII.)

Crown of the head, lores, ear-coverts, wings and tail black, the wing-coverts tipped with white; the secondaries margined with white, and the outer tail-feathers margined on the apical portion of the external web and largely tipped with white, the white becoming less and less, until only a slight trace of it is found on the central feathers; back olive-black; throat white; line from the nostrils over each eye,

the breast, abdomen and under tail-coverts bright yellow; bill black; feet bluish black.

Total length, 5 inches; bill, $\frac{5}{8}$; wing, 2; tail, $2\frac{1}{4}$; tarsi, $\frac{1}{2}$.

Hab. Cape York, Northern Australia.

In the possession of the Zoological Society.

PTILOTIS FILIGERA. (Aves, Pl. XXXIV.)

Upper surface, wings and tail rich olive-brown, with numerous small marks of greyish white on the apical portion of the nuchal feathers; the wing-coverts broadly, and the remainder of the feathers narrowly edged with brownish buff; from the gape beneath the eye a streak of white; ear-coverts blackish grey; from the centre of the lower angle of the ear-coverts a very narrow streak of silky yellow, which, proceeding backwards, joins the line of white from beneath the eye; throat brownish grey; under surface sandy buff, the feathers of the breast and the middle of the abdomen with lighter centres; bill olive-black; naked space beneath the eye yellow; legs and feet slate-colour.

Total length, $7\frac{3}{4}$ inches; bill, 1; wing, 4; tail, 3; tarsi, $\frac{7}{8}$.

Hab. Cape York, Northern Australia.

Remark.—The young is destitute of the white marks on the nape, and has the under surface more rufous, and without the lighter centres.

This species is somewhat allied to *Ptilotis unicolor*.

In the collection of the Zoological Society.

ARSES KAUPI.

Small spot on the chin, crown of the head, lores, line beneath the eye, ear-coverts, broad crescentic band across the back, and a broad band across the breast, deep shining bluish black; wings and tail brownish black; throat and a broad band across the back of the neck white; lower part of the back and abdomen white, the base of the feathers black, which, occasionally showing through, give those parts a mottled appearance; bill bluish horn-colour, becoming lighter at the tip; feet black.

Total length, $6\frac{1}{2}$ inches; bill, $\frac{1}{2}$; wing, $3\frac{1}{8}$; tail, $3\frac{1}{4}$; tarsi, $\frac{3}{4}$.

Hab. North coast of Australia.

Remark.—I embrace this opportunity of paying a just compliment to my friend Dr. Kaup, whose ornithological labours are so well known to all naturalists: the compliment is the more appropriate, as he is at this time engaged in preparing a monograph of the *Muscicapidae*, to which family this bird belongs.

Genus PYCNOPTILUS.

Gen. Char.—Bill shorter than the head, slightly notched at the tip; culmen inclining downwards; nostrils basal, rather large, and partially covered with an operculum; base of the bill beset with a few fine bristles; wings short, very concave, round in form, the first quill very short, the second, third, fourth and fifth gradually increasing in length, the sixth, seventh, eighth and ninth equal and the longest; tail moderately long, rounded, the feathers soft and yielding; tarsi



W. & N. Hanhart, Imp.

PTILOTIS. FILIGERA. Gould.

Wolf. Lith.



J. Wolf, lith.

M & N Hanhart Imp

ORIOLUS BRODERIPPII. Bonap

considerably longer than the toes ; hind-toe strong, lateral toes equal ; plumage dense and silky.

PYCNOPTILUS FLOCCOSUS.

General plumage brown, inclining to rufous on the lower part of the back, upper tail-coverts and tail ; forehead, lores, throat and breast dark reddish buff, with a very narrow crescent of dark brown at the tip of each feather ; centre of the abdomen greyish brown, crossed by crescentic bands of black ; flanks and vent brown, passing into deep rufous on the under tail-coverts ; bill brown ; base of the under mandible fleshy brown ; legs and feet fleshy brown.

Total length, 7 inches ; bill, $\frac{5}{8}$; wing, $2\frac{3}{4}$; tail, 3 ; tarsi, $1\frac{1}{4}$.

Hab. Interior of New South Wales.

8. DESCRIPTIONS OF TWO NEW SPECIES OF ORIOLE.

BY CHARLES LUCIEN, PRINCE BONAPARTE.

ORIOLUS BRODERIPPII, Bp. (Aves, Pl. XVIII.) *O. vividè flavo-aurantius ; coronā occipitali, alis, rectricibusque ad basim mediis duabus ferè omnino nigris ; speculo alari flavo.*

Hab. in insulâ Sumbava.

Magistratui illustri, litium Conciliatori intricatissimarum, qui intimas Doctrinæ Naturalis recessus Populo humanissimè patefacit !

After the separation of *aureus* and *regens* this new species is certainly the most splendid of the true *Orioli*, of which I know fifteen species. It must therefore stand first in the series coming from *Sericulus*. Its nearest approach is *O. cochinchinensis (hippocrepis*, Wagl.), similar in form and stature. But in addition to its even stouter bill, the general orange hue and the yellow spot on the wing will at once distinguish our *Broderipii*.

Having dedicated an Oriole to Broderip, I dedicate a second new species to our Italian Broderip, Professor Fr. Baraffi of Turin, the celebrated and learned traveller.

ORIOLUS BARAFFII, Bp. (Aves, Pl. XVIII.) *O. flavo-olivaceus ; cervice, corporeque subtus flavissimis ; capite, nuchâ, juguloque nigerrimis ; alis nigris, speculo angustè albo ; rectricibus nigris, apice externarum magis magisque flavis.*

Hab. Ashantee.

This bird, received at the Leyden Museum from the West Coast of Africa, is similar in stature and colour to *Oriolus moloxita*, Rüpp. of the Eastern Coast, but well distinguished by the conical marking on the tail, which is similar to that of the common Oriole, the *Broderipii*, and *chinensis*, entirely wanting on the tail of *O. moloxita*.

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ERRATUM.

Page 106, Art. 4, for *Metopocerus cornutus* read *Iguana rhinolopha* throughout.

NOTICE.

Mammalia, Pl. XX., will be given in Part III.
Annulosa, Pl. XVII., will be given in Part IV.

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J. Wolf, lith.

M. & N. Hanhart, Imp.

BALÆNICEPS REX, Gould.

PROCEEDINGS

OF THE

ZOOLOGICAL SOCIETY OF LONDON.

January 14, 1851.

Prof. Owen, F.R.S., Vice President, in the Chair.

The following papers were read :—

1. **ON A NEW AND MOST REMARKABLE FORM IN ORNITHOLOGY.**
BY JOHN GOULD, F.R.S. ETC.

(*Aves, Pl. XXXV.*)

I have the pleasure of introducing to the notice of the Society on the present occasion the most extraordinary bird I have seen for many years, and which forms part of a collection made on the banks of the upper part of the White Nile, by Mansfield Parkyns, Esq., of Nottingham. For this bird I propose the generic name of *BALÆNICERS*, with the following characters :—

Bill enormously robust, equal in breadth and depth; sides of the upper mandible much swollen; culmen slightly elevated, depressed in the middle of its length, and terminating at the point in a very powerful hook; tomiae sharp, turning inwards and very convex; lower mandible very powerful, with a sharp concave cutting edge and a truncated tip; nostrils scarcely perceptible, and placed in a narrow slit at the base of the bill, close to the culmen; orbits denuded; head very large; occiput slightly crested; wings very powerful, the third, fourth and fifth feathers the longest; tail of moderate length and square in form; plumage soft and yielding; skin of the throat loose, and capable of dilatation into an extensive pouch; tibiæ and tarsi lengthened, the latter a fourth shorter than the former; the lower third of the tibiæ denuded; toes four in number, all extremely long, and without the slightest vestige of interdigital membrane; hind-toe on the same plane as the anterior ones and directed inwards; tibiæ and tarsi reticulated, the reticulations becoming much smaller

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on the joints; upper surface of the toes scutellated; nails powerful, and not much curved; the nail of the centre toe impectinated.

BALÆNICEPS REX.

Bill pale yellow, becoming horn-colour on the culmen and tip, and blotched with dark brown; orbits pale yellow; head and neck slaty grey, darkest on the crown; chest ornamented with lanceolate feathers of a similar colour, with a dark stripe down the centre; abdomen, flanks, thighs and under tail-coverts very pale grey; upper surface generally very dark grey, most of the feathers margined with light grey; primaries, secondaries and tail blackish grey; rump and upper tail-coverts light grey; legs greyish black.

Total length, from the tip of the bill to the extremity of the tail, 52 inches; from the tip of the bill to the end of the centre toe, 67; bill, from the gape to the tip, 9; depth of the bill, $4\frac{3}{4}$; breadth, 4; wing, 27; tail, 12; tibiae, 13; tarsi, 10; middle toe and nail, 7; external toe and nail, $6\frac{1}{2}$; internal toe and nail, $5\frac{1}{4}$; hind toe and nail, 4.

Hab. The upper part of the White Nile, in Eastern Africa.

Remark.—This is evidently the Grallatorial type of the *Pelecanidae*; at least such is the conclusion to which I am directed after a careful examination and comparison of it with *Pelecanus*, *Grus*, *Ardea*, and *Cancroma*, to none of which genera is it so nearly allied, except in general contour, as to *Pelecanus*. Perhaps the most singular feature connected with this form is the entire absence of interdigital membrane, a character so conspicuous in the Storks, Herons, and the Boat-bill, which latter bird is as nearly allied to *Nycticorax* as the present bird is to *Pelecanus*. Both *Cancroma* and *Nycticorax* have the nail of the centre toe strongly pectinated, which character is not found in *Pelecanus* nor in *Balæniceps*.

2. DESCRIPTIONS OF TWENTY SPECIES OF COLUMBELLÆ, AND ONE SPECIES OF CYPRÆA. BY J. S. GASKOIN.

1. COLUMBELLÆ TENUIS. *Testa pyramidalis, subventricosa, lærvis, tenuis, albicans, maculis irregularibus fuscis magnis longitudinaliter dispositis; anfractibus octo, duobus anticis gibbosis; spirâ subelongatâ, acuminatâ; aperturâ latâ, anticè divergente, posticè acuminatâ, labio externo tenui, internoque edentulo, varice externo subelevato; striis tenuibus ab varice anticè continuis; canali brevi.*

Shell pyramidal, rather ventricose, smooth, thin, of a dull whitish colour, with large distant dark brown markings extending, irregularly, in width and form longitudinally over the volutions, which are eight in number, the two anterior being gibbous, the others proceed to form an acuminate apex; the spire constitutes more than one-half the length of the shell*; aperture wide, diverging anteriorly,

* In estimating the proportionate length of the spire of the shell, I take the measurement from the termination of the last volution at its junction to form the posterior point of the aperture; and the width, at the largest diameter of the anterior whorl.

acuminated posteriorly; outer lip curved outwards, thin, without denticulations, as is also the inner lip, which is shining, and within of the same colour as the shell; a slightly elevated varix terminates the inner edge of the aperture, from which fine striæ pass obliquely forward over the dorsum to the anterior portion of the outer lip; channel short, slightly curved.

Length, $\frac{6}{100}$ of an inch; width, $\frac{2}{100}$ of an inch.

Hab. —? Cab. Gaskoin, specimen unicum.

2. **COLUMBELLA ALBINODULOSA.** *Testa oblongo-ovata, pallidissimè luteo-fulva, fasciis angustis interruptis tribus brunneis; spirâ acuminatâ, anfractibus septem; nodulis latis prominentibus subdistantibus albi-coronatis; aperturâ oblongâ subquadratâ albâ; labio externo crasso, recto, submarginato, intus denticulato; dentibus posticis majoribus, labio interno dentibus irregularibus subvaricosis; canali recto latiusculo subelongato.*

Shell oblong-ovate, of a very light yellowish brown colour, with three interrupted or dotted dark brown narrow bands, the first extending from the anterior point of the outer lip to the centre of the aperture, the second from the anterior third of the margin of the outer lip to the posterior part of the aperture, and the third from the posterior third of the margin of the outer lip along the anterior portion of the volutions spirally to the apex; broad nodules or tubercles, moderately prominent and rather distant, exist from the posterior portion of the outer lip over the dorsum or shoulder, and continuously on the centres of the whorls, and as the whorls become narrow, occupy them longitudinally on to the point of the spire, each nodule being crowned with an opake white blotch; opake white irregular markings are also on the anterior volution; spire acuminated, constituting rather less than one half the length of the shell; seven volutions, rather convex; aperture straight, rather wide; outer lip sharp at its edge, straight, curving suddenly on forming the channel; just within the lip is a row of about eight rather prominent teeth, the posterior being the larger; inner lip slightly denticulated with about six irregular varices, with a slight sharp prominence at its margin, the large whorl ribbed with fine striæ, most prominent anteriorly; channel straight, rather wide, slightly elongated and recurved.

Length, $\frac{4}{100}$ of an inch; width, $\frac{2}{100}$ of an inch.

Hab. —? Cab. Gaskoin.

3. **COLUMBELLA INTERRUPTA.** *Testa oblongo-ovata, albicans, fasciis duabus interruptis latis rufescenti-brunneis; fasciâ antice pallidiore; spirâ acuminatâ, anfractibus septem vel octo; aperturâ latiusculâ præcipue ad partem posticam; labio externo crasso margine acuto, intus denticulato, denticulis quatuor vel quinque; labio interno cum margine externo denticulato, aurantiaco; testâ extus cancellatâ striis spiralibus validis, longitudinalibus tenuibus; peritremate pallide aurantiaco, posticè subobtuso angulari; canali breviusculo latiusculo.*

Shell oblong-ovate, of a dull greyish white colour, with two distinct,

strongly marked, interrupted, broad, dark reddish brown bands, the anterior being the less deeply coloured, the markings being rather crescentic, with the horns pointing towards the aperture becoming more arrow-shaped advancing onwards; the anterior band extends from the fore part of the outer lip to the middle of the inner side of the aperture, the second from the posterior part of the edge of the outer lip over the dorsum at the shoulder, and spirally on the centres of the volutions to the apex; at the superior portion on the aperture side of each marking is an opaque white colouring; spire acuminate, seven to eight whorls; at the suture, spirally on to the apex, is a fine whitish varix having interrupted brown markings along its entire course; aperture rather straight and broad, widening posteriorly; outer lip thick, sharp at its edge, orange-coloured at its inner border, where there are four or five slight denticulations; inner lip has a finely denticulated ridge at its outer edge of an orange colour, within it is an angular projection forming the commencement of the channel; the whole external shell is cancellated, the transverse striæ being much stronger than the longitudinal, and especially anteriorly; peristome of a light orange colour, rather obtusely angular posteriorly; channel rather short and moderately wide.

Length $\frac{4}{100}$ of an inch; width, $\frac{2}{100}$ of an inch.

Hab. —? Cab. Gaskoin.

4. *COLUMBELLA LEUCOSTOMA*. *Testa ovata, albicans, nitens, posticè fasciâ latâ brunneâ spirâ ornata; apice albicante dimidio antico anfractuâ ultimi albido; spira acuminatâ, anfractibus septem; aperturâ guldque albis latiusculis, illâ posticè subquadratâ, labio externo intus subdenticulato, dentibus sex posticis majoribus; canali brevi latiusculo.*

Shell ovate, shining, of a whitish colour, having a broad brown band occupying the posterior half of the anterior volution and the entire of the sixth, fifth and fourth, except at their posterior edge, which is white, the brown band terminating in an undefined line near the suture; the three apicinal whorls are white, with very fine lightly coloured linear markings, and in like manner is the white anterior half of the last whorl finely but irregularly streaked; spire acuminate, seven volutions, which constitute the greater half of the length of the shell; aperture white, as is also the interior, rather broad, somewhat square posteriorly; outer lip gradually curved inwards, having within it about six slight denticulations, the posterior being the larger; inner lip smooth, spiral; a few fine striæ extend obliquely forwards over the dorsum of the channel from the slight varix at its outer edge; channel short, rather broad.

Length, $\frac{3}{100}$ of an inch; width, $\frac{1}{100}$ of an inch.

Hab. —? Cab. Gaskoin.

5. *COLUMBELLA PACIFICA*. *Testa oblongo-ovata, lacteo-opaca, maculis irregularibus distantibus rufescenti-brunneis ornata; intus alba; spira acuminatâ, anfractibus convexis septem vel octo posticè obtusissimè coronatis; aperturâ latâ rectiusculâ;*

labii externi margine tenui intus edentulo; labio interno lævi externè margine tenui; anfractu ultimo anticè valde striato, striis tenuioribus longitudinaliter decussantibus; canali brevi, lato, subrecurvo.

Shell oblong-ovate, of an opake milk-white colour, distantly maculated with dark reddish brown irregular markings, internally white; spire acuminated, constituting the greater half of the length of the shell; volutions seven to eight, convex, their posterior margin generally very obtusely and distantly coronated; aperture wide, rather straight; outer lip thin at the edge, even, no denticulation within, marginated; inner lip even, having a very slight straight edge or varix externally, from which rather strong striations pass over the anterior of the dorsum to the outer lip, and very much finer striæ longitudinally pervade the same; channel short and wide, very slightly curved.

This shell differs from *Columbella Miser*, Sowerby, in the absence of denticulation, in the last volution being much more gibbous, the aperture much wider, the channel decided, the spire more pyramidal, and much less coloration and markings.

Length, $\frac{45}{100}$ of an inch; width, $\frac{25}{100}$ of an inch.

Hab. Sandwich Islands. Cab. Gaskoin.

6. **COLUMBELLA VARICOSA.** *Testa oblongo-ovata, nitens, crassa, albicans, colore nigricanti-brunneo irregulariter induta; marginibus posticis anfractuum albicantibus; spirâ acuminatâ, anfractibus septem vel octo subventricosis varicosis validis prominentibus subobliquis instructis; parte anticâ ultimi anfractus levigatâ, anticè supra canalem transversè striatâ; aperturâ oblongâ subquadratâ rectâ intus cærulecente, labio externo recto, marginato posticè incisurâ magnâ instructo, intus denticulato denticulis posticis validiusculis, labio interno lævi margine elevato tenui; canali brevi latiusculo.*

Shell oblong-ovate, shining, thick, strong, of a white colour, generally irregularly and greatly covered, more or less intensely, with an almost black-brown coloration, excepting the posterior edges of the whorls, where it remains nearly white; spire acuminated, constituting one half the length of the shell, has seven to eight volutions, rather convex, slightly diagonal; strong, prominent, somewhat distant varices exist on the posterior margin of the last whorl, the anterior portion of which have many striæ passing transversely and obliquely forwards from the columellar edge of the aperture; aperture oblong, rather square and straight, internally of a bluish white colour; outer lip straight, marginated, having a rather large notch at the junction with the body of the shell, and having anteriorly to this notch, within, about five or six slight denticulations, the posterior being the larger; inner lip smooth, without denticulation, edge slightly elevated and thin; channel short, rather broad.

Length, $\frac{80}{100}$ of an inch; width, $\frac{35}{100}$ of an inch.

Hab. Peyta, Peru. Cab. Cuming, Gaskoin.

7. **COLUMBELLA AUSTRALIS.** *Testa oblongo-ovata, albicans,*

maculis parvis irregularibus brunneis inæqualibus ornata, majoribus saturationibusque apud marginem posticum anfractuum positis; spiræ acuminatæ, anfractibus octo subgibbosis, apice albicante; aperturæ latiusculæ intus cærulecente, labio externo recurvo ad canalem convergente, intus denticulis septem ad octo subprominentibus subdistantibus, labio interno lævi anticè angulifero; canali latiusculo brevi recurvo, anfractu ultimo anticè transversim striato; peritremate posticè angulari.

Shell oblong-ovate, of a whitish colour, greatly covered with small, irregular, dark brown, conjoined specklings, of unequal intensity in coloration, the larger and darker markings being at the edges of the whorls; three rather narrow interrupted bands traverse the last whorl, the posterior one proceeding along the anterior margin of the volutions; spire acuminated, being rather the greater half-length of the shell; volutions eight, slightly gibbous, the four apicinal white; aperture rather broad, internally of a bright pinkish blue-white colour, slightly iridescent; outer lip a little curved, converging at the channel; within are seven or eight irregular, slight elevations or denticulations, rather distant, at the anterior portion of the edge are several fine denticulations; inner lip smooth, with a very slight thin varix at the anterior part; an obtuse angularity forms the commencement of the channel; channel rather wide, short, and a series of rather fine parallel striae traverse the anterior part of the last whorl; peritreme angular posteriorly.

Length, $\frac{8}{100}$ of an inch; width, $\frac{25}{100}$ of an inch.

Hab. Sydney. Cab. Gaskoin, Cuming.

8. **COLUMBELLA CANCELLOTA.** *Testa ovata, pallidæ aurantiaco-brunnea; apice roseo, superficie omnino cancellatæ, serie posticæ granulorum majore; spiræ acuminatæ anfractibus septem; aperturæ latiusculæ brevique, labio externo subrecurvo convergente, intus denticulis quatuor vel quinque subprominentibus, labio interno lævi; canali latiusculo, brevi, peritremate posticè obtuse angulari.*

Shell ovate, of an uniform light orange-brown colour, except the apex, which is pink, deeply cancellated over its entire surface, having the posterior line of nodules larger than the others; spire acuminated, and forms rather more than half the length of the shell; volutions seven; aperture rather broad and short; outer lip slightly curved, converging towards the channel; within it are four or five rather prominent denticulations; inner lip smooth, very obtusely nodulated at its exterior slightly elevated edge; channel moderately broad, short, curved towards the columella; peritreme obtusely angular posteriorly.

Length, $\frac{35}{100}$ of an inch; width, $\frac{18}{100}$ of an inch.

Hab. West Indies. Cab. Gaskoin.

9. **COLUMBELLA PULLA.** *Testa oblongo-ovata, saturate brunnea; parte anticæ ultimi anfractus, columellæque albicantibus; spiræ acuminatæ, anfractibus octo vel novem, concrexiusculis,*

suturā lāvi; aperturā latiusculā posticē acuminatā, labio extero tenui lāvi, intus subdenticulato, saturate brunneo, labio interno lāvigatē subdenticulato, anticē subalbido, margine interno varicem rectum efformante, parte anticā testā transversim striatā; canali mediocri, recto.

Shell oblong-ovate, of an uniform dull, very dark brown colour, and also within, excepting the columella and edge of the outer lip, which are white; spire acuminated; volutions eight or nine, slightly convex, even at the suture; aperture rather acuminated posteriorly; outer lip thin, smooth, internally slightly denticulated; inner lip shining, with slightly elevated nodules or teeth, and its edge forms a fine straight varix, from which a few thin striæ pass over the dorsum of the channel; channel moderately wide and straight.

Length, $\frac{52}{100}$ of an inch; width, $\frac{20}{100}$ of an inch; length of spire, $\frac{30}{100}$ of an inch; length of last whorl, $\frac{22}{100}$ of an inch.

Hab. —? Cab. Gaskoin.

10. **COLUMBELLA INTEXTA.** *Testa oblonga, angusta, lāvis, albicans, strigis punctulisque irregularibus saturate brunneis ornata; spira acuminatā, anfractibus novem vel decem; marginibus posticis anfractuum brunneo maculatis, ultimo anfractu anticē similariter colorato; suturā elevatā; aperturā breviuscula angustāque, labio extero arcuato, ad marginem acutiusculo, extus crassiusculo, ad canalem convergente, labio interno ad marginem subvaricoso, lāvi, edentulo; canali breviusculo, angustato, extus transversim striato.*

Shell elongated, narrow, smooth, of a dull whitish colour, having dark brown irregular dottings and streaks pervading the entire surface of the shell; irregular, rather large and distant, similarly coloured spots are on the posterior margin of the volutions to the apex, and a band, similarly indicated at the anterior part of the last whorl; spire acuminated, constituting about two-thirds of the length of the shell; volutions nine to ten, suture elevated; aperture rather short and narrow; outer lip arched, sharp at its edge, thickened externally, converging towards the channel; inner lip slightly ridged at its edge, smooth, without denticulations; channel rather short, somewhat narrow, externally transversely striated.

Length, $\frac{55}{100}$ of an inch; width, $\frac{20}{100}$ of an inch.

Hab. Australia. Cab. Cuming, Gaskoin.

11. **COLUMBELLA CONTAMINATA.** *Testa oblonga, lāvis, saturate brunnea, intus subalbida, linea suturali albicante subinterrupta; spira acuminatā dimidium testā superante, anfractibus octo vel novem convexiusculis; aperturā posticē latā, anticē angustiore, margine extero lato, crasso, intus denticulis linearibus sex vel septem; margine interno tenui, albicante, intus denticulis prominentibus confertis albicantibus sex supra columellam continuis, columellā interstitiisque rufescenti-brunneis; canali prominente angusto subrecurvo, margine interno violaceo, parte externā transversim striatā.*

Shell oblong, smooth, of an uniform light brown colour, whitish within; a narrow interrupted white band proceeds from the middle of the margin of the outer lip and continues along the posterior edge of the volutions to the apex; a less defined band traverses the dorsum more anteriorly, and terminates at the middle of the inner side of the aperture; spire acuminated, comprising more than one half the length of the shell; volutions eight to nine, slightly convex, suture a little elevated; aperture rather wide, shining, broader posteriorly; outer lip whitish, and thick externally, edge sharp, violaceous for a little distance within, with six or seven linear denticulations; inner lip, a fine whitish varix extends from the curve of the aperture to the anterior point of the channel; within this varix, at its centre, are five or six denticulations, closely set, parallel, prominent, proceeding over the columella, whitish at their edges, the interstices and the portion exterior to them being of a reddish brown colour; channel projecting, narrow, slightly recurved, with a dark violaceous colour within; a number of rather strong striæ pass from the inner side of the aperture to the edge of the anterior half of the outer lip.

Length, $\frac{5}{100}$ of an inch; width, $\frac{2}{100}$ of an inch.

Hab. —? Cab. Gaskoin.

I have seen but one of this characteristic species: the aperture is allied in form to that of *Columbella Puella*, Sowerby. It may be convenient to readers to state, that the species *Col. Puella* is by accident, in the index of the 'Thesaurus Conchyl.' of Sowerby, jun., entered as *Col. Nympha*.

12. COLUMBELLA MARQUESA. *Testa oblongo-ovata, albicans; anfractibus sex vel septem; 4 vel 5 posticis roseis, longitudinaliter striatis, anfractibus tribus anticis lævibus spiraliter rufescenti-brunneo lineatis; spira acuminatæ, dimidium testæ æquante; aperturæ mediocri rectiusculæ; labii externi margine tenui posticè marginato, extus incrassato, edentulo, labio columellarì lævi nitido, margine crassiusculo elevato; canali extus transversim striato, brevi.*

Varietas hujus testæ major differt pro colore.

Shell oblong-ovate, of a dull white colour; spire acuminated, forming about one-half the length of the shell; volutions six to seven, which, with the last volution, the columellar side of the shell forms an even convexity; the first four or five whorls are of a rose or bluish-pink colour, minutely longitudinally striated; the others are smooth, with somewhat distant fine brown lines, seven, eight, or so in number, passing spirally and contiguously from just within the outer lip along the three last whorls, to the commencement of the pink striated volutions; aperture moderately wide and long, rather straight; outer lip sharp at its edge, forming a notch at its junction with its next whorl, thickened externally, without denticulation; inner lip also edentulate, smooth, shining, externally forming a rather thick, slightly elevated varix, which extends to the extremity of the channel, and from the whole length of this varix fine striæ pass over

the dorsum of the channel to the anterior portion of the outer lip ; channel short.

A variety of this species is rather larger in size, with the markings along the posterior edge of the three last whorls in somewhat distant, brown, square spots, from which rather distant undulating lines of a lighter colour pass longitudinally over the volutions, while in some specimens the colour is more *en masse* on the last whorl with small circular spots in it, showing the colour of the shell.

Length, $\frac{3}{100}$ of an inch ; width, $\frac{1}{100}$ of an inch.

Hab. Marquesas. Cab. Gaskoin, Gubba.

13. *COLUMBELL AUSTRINA*. *Testa oblongo-orata, lærvis, nitens, albicans, punctulis distantibus pallidissime brunneis, fasciâque anticâ latâ brunneâ ornata ; spirâ acuminatâ, anfractibus septem vel octo, converiusculis ; suturâ distinctâ ; aperturâ latiusculâ, labio externo posticâ intus emarginato ; margine acutiusculo versus canalem incurvo, intus denticulis prominentibus octo vel novem ; labio columellari recto, nitido, denticulis septem anticâ positis, margine externo subelevato ; peritreme albicante, aperturâ intus violaceo-brunneâ ; canali subprominente, latiusculo, dorso canalis transversim striato.*

Shell oblong-ovate, of a dull white colour, smooth and shining, with light brown coloration, or interrupted from the anterior side of the volutions of the spire, and extending, more or less faintly, over them ; a much darker broad band occupies three-fourths, at its centre, of the last whorl, the colour gradually softening into the whitish anterior, posterior, and outer portions of the whorl ; spire acuminated, constituting less than one half the length of the shell ; volutions seven to eight, rather convex, slightly ridged at the suture ; aperture rather long, and moderately wide and straight ; outer lip forms a broad notch at its juncture with the body of the shell, edge sharp, curving much towards the channel, externally thickened ; within are eight or nine rather prominent denticulations, diminishing in size from their commencement at the anterior edge of the notch ; inner lip straight, smooth and shining, with a row of about seven small, even, round teeth, which extend over the columella, and a very slightly raised sharp varix forms the outer edge of the aperture proceeding to the end of the channel ; from this varix fine striæ pass over the dorsum of the channel to the anterior part of the outer lip ; peritreme whitish, the interior of the shell of a rather violaceous colour ; channel slightly projecting, moderately wide.

Length, $\frac{5}{100}$ of an inch ; width, $\frac{2}{100}$ of an inch.

Hab. Australia. Cab. Cuming, Gaskoin.

14. *COLUMBELL BACCATA*. *Testa oblongo-ovata, albicans, fasciis tribus interruptis saturate rufescenti-brunneis, punctulis opacis albicantibus rotundis per lineas obliquas vel longitudinales positis ; spirâ acuminatâ, anfractibus septem, quorum tribus anticis læribus, posticis obtuse longitudinaliter striatis ; apice albicante ; aperturâ latiusculâ intus albicante fasciis*

brunneis tribus conspicuis; labio externo crassiusculo denticulis paucis intus prope centrum positis; labio interno recto, ad marginem externum varice prominente instructo; canali lato, obtuso.

Shell oblong-ovate, of a dull white colour, with three dark reddish brown interrupted bands traversing the last whorl, the anterior extending from the fore-part of the outer lip to that of the aperture, the second continuing along the anterior margin of the volutions to near the apex, and the third passing similarly on their posterior margin to the same extent; opake, whitish, distinct, small round spots pervade the four anterior volutions, being in rows, obliquely or longitudinally placed; shell, within of a dull white colour, the three bands being conspicuous; spire acuminated; volutions seven, the three anterior smooth, the posterior obtusely striated longitudinally, apex whitish; aperture rather wide and straight; outer lip somewhat thick, having a few (one or two) rather prominent denticulations within the edge, about the centre; inner lip straight, with a rather strong varix at its outer edge; channel wide and obtuse; a few striae pass obliquely over the anterior part of the columellar side of the dorsum.

Length, $\frac{25}{100}$ of an inch; width, $\frac{12}{100}$ of an inch.

Hab. —? Cab. Gaskoin.

15. *COLUMBELLASAGITTA.* *Testa oblonga, subcylindracea, angustata, lavis, nitens, semipellucidula, pallidissime brunnea; fasciis duabus angustis interruptis albidi-opacis, ab postico margine anfractuum ad apicem continuis; spirâ acuminatâ, 3-5 longitudinis testæ; anfractibus octo; aperturâ brevi, latâ; labio externo crassiusculo extus margine albini-opaco, versus canalem incurvato, labio interno lavi nitido; dorso anticè transversim striato; canali longiusculo, latiusculo; peritremate subquadrangulo.*

Shell oblong, subcylindrical, narrow, smooth, shining, semitransparent, of an extremely pale brown colour, with a very narrow interrupted opake white band arising from about the middle of the outer lip, and continuing along the anterior edge of the whorls to the apex; the markings forming this band are pointed, the points being toward the outer lip; large white opake markings occupy the entire posterior margin of the volutions, conjoined at the suture by broad bases, and, diminishing pyramidal to a point, extend across the volutions, and between each pyramidal mark, fitting the interstices, are dark, reddish-brown, barb-shaped colorations; spire acuminated, constituting three-fifths the length of the shell; volutions eight, very slightly convex; aperture short, rather wide; outer lip moderately thick, much incurvated to form the channel, with a whitish opake strong margin externally, edentulous; inner lip even, and shining, with a slight varix along its outer border, from which several rather prominent striae traverse the anterior part of the dorsum to the fore part of the outer lip; the columella terminates angularly at the beginning of

the channel; channel rather long, moderately wide; peritreme subquadangular.

Length, $\frac{3}{10}$ of an inch; width, $\frac{1}{10}$ of an inch.

Hab. Africa; West Indies. Cab. Metcalfe, Cuming, Gaskoin, &c.

16. **COLUMBELLÀ CONSPERSA.** *Testa oblongo-ovata, pyramidalis, pallide brunnea, maculis anticis, albi-opacis, irregularibus; fasciis tribus albi-opacis, brunneo interruptis, duabus posticis ab aperturâ ad apicem continuis; spirâ acuminatâ anfractibus novem vel decem convexiusculis; aperturâ rectâ, latiusculâ; labio externo ad marginem acuto, margine externo lato prominentem, intus denticulis quatuor quinque vel sex parvis; labio interno laevi, nitido, intus varice parvo denticulato, extus varice subprominente ad laterem canalis extenso; striis tenuibus per anticam partem dorsi continuis; canali longiusculo, angusto, leviter recurvo; peritremate subquadangulo, lilacino.*

Shell oblong-ovate, pyramidal, of a dull pale-brown colour, with opake white, irregular markings on the anterior half of the last whorl; three opake white bands; the two anterior, interrupted and edged posteriorly with dark brown coloration, traverse the last whorl; the second, arising from the middle of the outer lip in narrow streaks, continues along the anterior edge of the volutions close to the suture, on to the apex; the third arises at the posterior part of the outer lip, sometimes in conjoined nodules, edged anteriorly and interrupted by a dark brown colour, passes over the dorsum and continues in irregularly broad, even streaks on the posterior margin of the whorls on to the apex. [These characters are marked in fine specimens, but are sometimes rendered less conspicuous by irregularity in the opake white deposition.] Spire acuminated, constituting rather more than one-half the length of the shell; volutions nine to ten, slightly convex; aperture straight, moderately wide; outer lip sharp at the edge, converges abruptly to form the channel, a broad prominent margin externally, within are four, five, or six denticulations; inner lip smooth and shining, within is a little ridge forming about six nodules or teeth, and at the outer edge is a rather strong varix extending on to the side of the channel, and from the outer side of which varix fine striæ traverse the anterior portion of the dorsum; channel rather long and narrow, slightly recurved; peritreme rather quadrangular, and of a lilac colour.

Length, $\frac{5}{10}$ of an inch; width, $\frac{2}{10}$ of an inch.

Hab. —? Cab. Gaskoin.

17. **COLUMBELLÀ FORMOSA.** *Testa oblongo-ovata, laevis, nitida, colore flori-lacteo induta; fasciis duabus maculis albicantibus brunneisque interruptis; spirâ acuminatâ, ad dimidium longitudinis testæ aequali; anfractibus septem vel octo convexiusculis, suturâ subprominente; aperturâ latiusculâ et breviusculâ; labio externo laevi tenui, interno laevi; canali lato.*

Shell oblong-ovate, smooth and shining, of a light delicate cream colour, with two interrupted bands of opake white and brown mark-

ings mingled together, the first arising from the anterior point of the outer lip, and proceeding to the inner edge of the aperture; the second from the middle of the outer lip, and extending along the anterior margin of the volutions to the apex; spire acuminated, of half the length of the shell; volutions seven to eight, rather convex, suture slightly prominent; aperture somewhat wide and short; outer lip smooth and thin; inner lip even and also edentulous, no varix at its inner border; channel short and wide; a few striae traverse the anterior part of the dorsum.

Length, $\frac{4}{100}$ of an inch; width, $\frac{2}{100}$ of an inch.

Hab. —? Cab. Gaskoin.

18. *COLUMBELLIA HIRUNDO*. *Testa ovato-pyramidalis, lœvis, nitens, pallida, strigis punctisque brunneis leviter maculata; spirâ mucronatâ, dimidium longitudinis testæ aequante; anfractibus novem vel decem planis; aperturâ latiusculâ; labio externo crasso albo semicirculari, dentibus duobus vel tribus latis posticis internis, margine externo crasso albo; labio interno lœvi, subspirali, dente solitario majusculo ad posticam partem; canali longo, latiusculo, recurvo, rostris prominentibus, externo divergente quasi furcato ut in formâ caudæ hirundinis.*

Shell ovato-pyramidal, smooth and shining, pale in colour, lightly speckled with fine brown streaks and dottings, with intermissions of colour along the darker coloration of the posterior edge of the volutions; spire sharply mucronated, being about half the length of the shell; nine to ten flat volutions; aperture rather broad; outer lip thick, white, semicircular, with two or three broad denticulations within posteriorly, converges abruptly to form the channel; external margin strong and white; inner lip smooth, subspiral, with a single rather large node or tooth at the posterior part; channel long and moderately wide, recurved, beaks prominent, outer one diverging, giving a forked appearance, as in the tail of the swallow.

This species is of the stamp of *Col. bicanalifera* of Sowerby, Proc. Zool. Soc. part ii. page 113; Sowerby's Thesaurus, fig. 144.

Length, $\frac{6}{100}$ of an inch; width, $\frac{2}{100}$ of an inch.

Hab. Per the 'Samarang.' Cab. Gaskoin.

19. *COLUMBELLIA CALIFORNIANA*. *Testa oblongo-ovata, sub-pyramidalis, lœvis, nitens, brunnea, vel brunneo variabilis, aliquando lineis tenuibus, fortioribus, aut latiusculis irregularibus; spirâ acuminatâ dimidium testæ subæquante; anfractibus septem convexis; aperturâ latâ subquadrangulari; labio externo tenuiusculo intus denticulato, labio interno leviter denticulato; dorso anticè transversim striato; peritremate purpureo-nigricante; canali brevi.*

Shell oblong-ovate, smooth and shining, rather pyramidal, of a brown colour, varying much in intensity and markings, in being sometimes uniform, in others with one or two thin darker coloured cinctures, or with broad and continuous dark irregular markings

spirally passing on the whorls to be lost in the deeper colour of the apicinal volutions; spire acuminated, about half the length of the shell; volutions seven, convex; aperture wide, subquadangular; outer lip rather thin, denticulated within on its whole extent; inner lip slightly denticulated along its rather angular inner edge; fine striae traverse the anterior part of the dorsum; peritreme of a dark purple-brown colour; channel very short.

Length, $\frac{4}{10}$ of an inch; width, $\frac{2}{10}$ of an inch.

Hab. Sandiego, California. Cab. Cuming, Gaskoin.

20. **COLUMBELLIA IGOSTOMA.** *Testa oblongo-ovata, irregulariter brunnea; spirâ acuminatâ, apice cæruleo-brunnea; anfractibus septem vel octo raptim longitudinaliter decrescentibus; costellis prope aperturam minus prominentibus, costis ad posticum marginem in tuberculis posticè terminantibus; aperturâ posticè latiusculâ, anticè subacutâ; labio externo tenui, intus denticulato; labio interno intus denticulato, varice prominente marginato; dorso anticè extus striato; canali longiusculo; margine peritrematis purpureo-brunnescente.*

Shell oblong-ovate, of an irregular brown colour; spire acuminated, apex dark bluish brown colour; volutions seven to eight, greatly decreasing in circumference on to the apex, strongly ribbed longitudinally, less strongly towards the aperture, the ribs terminating in colourless nodules at the posterior edge of the volutions; aperture rather broad posteriorly, subacute anteriorly; outer lip thin, denticulated to its full extent within; inner lip denticulated within, bordered by a rather prominent varix, from the outside of which striae pass over the dorsum of the channel; channel rather long and broad; edge of peritreme of a dark purplish brown colour.

Length, $\frac{5}{10}$ of an inch; width, $\frac{2}{10}$ of an inch.

Hab. Port Essington. Cab. (specimen unicum) Gaskoin.

CYPRÆA CLARA. *Testa subcylindraceo-ovalis, rufescens-cinerea, anticè et posticè supra extremitate maculâ brunneâ ornata; fasciis latis saturationibus tribus; basi marginibusque albescensibus; aperturâ latiusculâ subspirali; labio externo crassiusculo, dentibus circa viginti-sex, regularibus, prominentibus; interno subspirali, dentibus circa viginti; sulco columellari profundo latoque, intus denticulato; marginibus rotundatis, incrassatis; extremitatibus obtusis, punctis minutissimis nigris notatis.*

Shell subcylindrical-ovate, of a lightish red-ash colour, with three broad bands placed about the anterior and posterior thirds and middle of the shell, the middle one being narrowest, the lighter colour of the shell being observed between them; a rather large reddish-brown marking over the anterior and posterior extremities, gradually fading along the margins; base whitish in a degree tinted with pink, round; the calcareous deposit forming the denticulations extends on to the sides of the shell; aperture moderately wide, subspiral; outer lip thick, with about twenty-six regular, even, rather prominent teeth occupying the entire thick edge of the lip but not extending on to

the base; inner lip subspiral, about twenty projecting teeth terminating outwardly in an even line at the edge of the aperture; columellar sulcus broad and deep, which about eight of the anterior teeth traverse and strongly serrate its inner border, no columellar groove; the posterior teeth, proceeding but a little distance within the aperture, terminate on the columella; the sulus being so deep causes a rather angular prominence of the inner side of the channel; margins thick and round; extremities, the external posterior broad and obtuse, the internal edge-formed concave within; the anterior project moderately and converge; all are dotted with very minute black points which extend in a slight degree on to the margins; channels, anterior rather narrow and short, posterior moderately wide, both inclining towards the columella.

Length, $1\frac{25}{100}$ inch; width, $\frac{75}{100}$ of an inch.

Hab. —? Cab. Cuming.

This species is of the stamp of *Cyp. Isabella*, Linn.

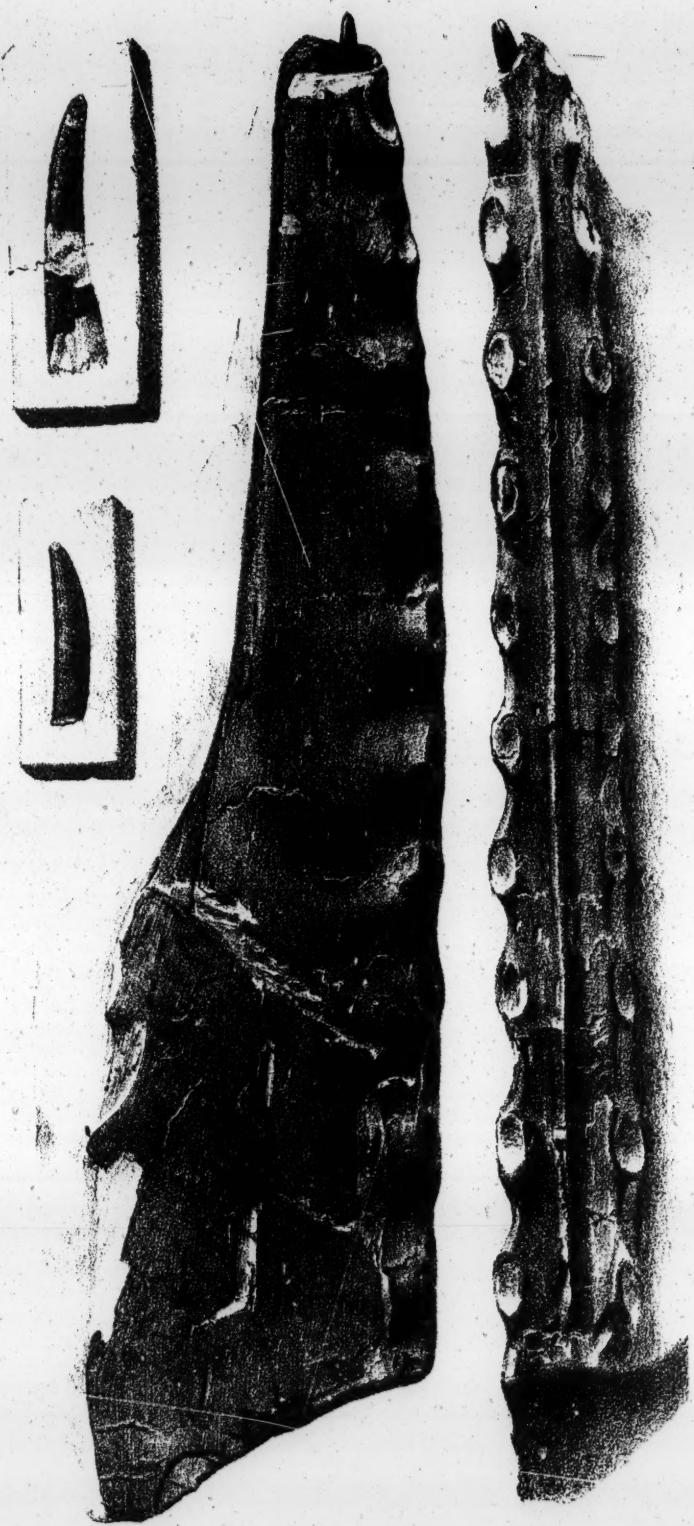
3. ON THE PTERODACTYLES OF THE CHALK FORMATION.

BY J. S. BOWERBANK, ESQ., F.R.S. ETC.

(*Reptilia, Pl. IV.*)

On the 14th May 1845 I exhibited at the Meeting of the Geological Society the snout and under jaws, extending from the point to about the middle of the cavitas narium, of a new and gigantic species of *Pterodactylus*, with some other bones, a portion of which belonged to the same individual, and others which have every appearance of having belonged to another animal of the same species *, and I then stated my belief that the bone figured by Prof. Owen, in the 'Transactions of the Geological Society,' vol. v. pl. 39, 2nd Series, would probably ultimately prove to be that of a Pterodactyl. From the great size of the snout, and the gigantic proportions also indicated by the bones accompanying it, I was induced to give it the specific name of *giganteus*. On a subsequent occasion, June 9, 1847, I continued my remarks on these Reptile remains, in a paper entitled "Microscopical Observations on the Structure of the Bones of *Pterodactylus giganteus* and other fossil animals," in which I endeavoured to prove, by the strongly-marked peculiarities of the bone-cells in Mammals, Birds and Reptiles, that the whole of the bones described in my former paper, and those figured by Prof. Owen in the Trans. Geol. Soc., 2nd Series, vol. vi. pl. 39. figs. 1 & 2, were in truth of purely Reptilian character; and I also figured a radius and ulna from the Cabinet of Mrs. Smith of Tunbridge Wells, of nearly the same gigantic proportions as the one formerly in the possession of the Earl of Enniskillen, but now in my collection (fig. 1. pl. 39, Geol. Trans.), and a bone from the Cabinet of Mr. Toulmin Smith, equivalent to that represented by Prof. Owen in the same plate, fig. 2, which bones presented the same structural evidence of their Reptilian nature, and

* Quart. Geol. Journ. vol. ii. p. 7. pl. 1. figs. 1-6.





which description of evidence has, I am happy to say, been more fully developed and firmly established by the talented coadjutor of Prof. Owen, Mr. Quekett of the Royal College of Surgeons, who has publicly taught it in the Theatre of that Institution without question or contradiction of its truth. This great radius and ulna in Mrs. Smith's Collection I referred to my previously established species, *P. giganteus*, believing at that time that they were probably the bones of a fully developed animal, while those previously described were the remains of animals not developed to the full extent of their capability.

Since the publication of these specimens it has been my good fortune to obtain the snout of another and still larger species of *Pterodactyl*, from the same pit at Burham in Kent, and which it is probable will ultimately prove to belong to the species to which the enormous pair of bones in the Cabinet of Mr. Charles of Maidstone belongs. Should this hereafter prove to be the case, it will then remain to be shown whether the beautiful specimen of radius and ulna in the Collection of Mrs. Smith of Tunbridge Wells, and the bone nearly corresponding in size with them, and which was in the possession of the Earl of Enniskillen, belong to the newly discovered species, which I purpose designating *Pterodactylus Cuvieri*, or to the previously named species, *P. giganteus*; or whether there be yet a third species existing in the chalk, to which these bones of an intermediate size may hereafter be referred*.

The snout of the new species, *P. Cuvieri*, differs materially in its form from the same part of *P. giganteus*: while the latter agrees as nearly as possible in that respect with *P. crassirostris* and *P. brevirostris*, the former appears to approach very closely the proportions of *P. longirostris*. Thus, if we take the length of the snout from the distal end of the cavitas narium, as compared with its height, at the same point of *P. crassirostris*, *P. brevirostris* and *P. giganteus*, we find the relative proportions to be,—of the first-named, 29 of height to 56 of length; of the second, 28 of height to 50 of length; and of the third, 28 of height to 58 of length; we may therefore reasonably conclude that, when perfect, the head of *P. giganteus* very closely resembled in its proportions that of *crassirostris*. The length of the fragment of the snout of *P. Cuvieri* at the upper portion of the head is 7.20 inches; at the palatal bones, 6.38 inches; and in this space there are sockets for twelve teeth on each side. The distance between each tooth is about $1\frac{1}{2}$ of the long diameter of the sockets, which are somewhat irregularly placed, but are nearly equidistant from each other. The pair of teeth at the distal end of the snout appear, both from the position of the sockets and the tooth remaining *in situ*, to have been projected more or less forward, in a line with the palatal bones. The head appears to have been exceedingly narrow throughout the whole of its length. At the third pair of teeth from the distal

* A third species, *C. compressirostris*, has since been described by Prof. Owen, page 95, Part III. of 'The Fossil Reptilia of the Cretaceous Formations,' published by the Paleontographical Society, and to which species the bones in question have been referred.

end of the snout it measures .66 inch, and at the eleventh pair of teeth, .78 inch wide. Opposite the seventh pair of teeth the skull curves upward suddenly and considerably, which is not the case at any part of the corresponding portion of the skull of *P. longirostris*; it is therefore probable, that although in the number and disposition of the teeth in the upper jaw, as far as our evidence goes, it strongly resembles *longirostris* in its structure, yet in the length of its skull it is probably shorter in proportion than that species, apparently in that respect being intermediate between *longirostris* and *crassirostris*; thus uniting the long-nosed with the short-nosed species of Pterodactyls.

There are no remains of the cavitas narum in the new species, but it is not to be expected that it should make its appearance so near to the termination of the snout, as in *longirostris* the distal portion of that cavity is situated as far backward from the last of the dental series of the upper jaw as that tooth is from the end of the snout. The number of teeth on each side of the upper jaw in *P. longirostris* is twelve, and the like number of sockets are apparent in our specimen; it is therefore probable that we have the whole of that portion of the head.

If we estimate the size of the head on the scale of *P. longirostris*, it would appear to be 25.52 inches in length; but as we have observed that the skull curves upward considerably at the seventh pair of teeth, it is probable that its length may not be so much.

The length of the wing of *P. crassirostris* in proportion to the length of its head is 3.91 times. The length of the wing of *P. longirostris* compared with the length of its head is 2.51; if therefore we assume, from the peculiar form of the snout of *P. Cuvieri*, that the head as regards length is intermediate in its proportions between *P. crassirostris* and *P. longirostris*, it should be 3.21 parts of the length of the wing.

The snout contracts in width gradually upwards from the sockets of the teeth, so that its upper portion forms a narrow ridge, and this is its form as far backward as it can be traced. The palatal bones are depressed, the suture forming a prominent ridge as far as it is visible, but not in so great a degree as in *P. giganteus*.

One of the first pair of teeth remains in its socket; the whole of the other large teeth are displaced, but there are two of them imbedded in the chalk, one within an inch and the other an inch and a half of the sockets, and in the fifth right and eighth left socket there is a rudimentary tooth *in situ*. The largest of the displaced teeth exceeds 1.32 inch in length, and has been buried in the socket for nearly an inch; the second large tooth, which is imbedded near the third pair of sockets, does not exceed an inch in length; both teeth are slightly curved, smooth, and are hollow at the base.

The great diversity in the size of these remarkable Reptiles will render a short review of some of the known species interesting; and if we arrange them in order, as they increase in size, the following will be the series:—1. *P. brevirostris*, 2. *P. longirostris*, 3. *P. crassirostris*, 4. *P. Bucklandi*, 5. *P. grandis*, 6. *P. giganteus*, 7. *P. Cuvieri*; and to these may be added the bones in the possession of Mrs. Smith, the

Earl of Enniskillen, and Mr. Charles. Of these, *brevirostris*, *crassirostris* and *giganteus* are short-nosed species, *longirostris* and *Cuvieri* long-nosed. With regard to relative length and proportions of the other parts of the skeleton we have ample means to arrive at tolerably correct conclusions, in consequence of the nearly perfect condition of *brevirostris*, *crassirostris* and *longirostris*. In the former two we find the cervical vertebrae short and thick, the length being about equal to the height in the latter of the two, while in *longirostris* they vary in length from three to five times their own diameter at the middle. Very uncertain results therefore would arise from finding single bones of this portion of the skeleton, excepting that a long and attenuated cervical vertebra would seem to indicate a corresponding length of snout; but from the other bones of the animal, more especially those of the wing, much more satisfactory results may arise. Upon a careful measurement of the casts in the British Museum from the original specimens, I find the following to be the length of the bones of the wing of *P. longirostris* :—

	inch.	
Humerus	1.25	= 8.55 of length of wing.
Radius and ulna	1.90	= 5.57
Carpus	0.13	= 0.82
Metacarpus	1.34	= 7.97
1st Phalange	1.90	= 5.57
2nd ,	1.75	= 6.10
3rd ,	1.25	= 8.55
4th ,	1.17	= 9.13
	<hr/>	
	10.69	
		inches.
The length of the head		4.25
From the tip of the nose to the commencement of the cavitas narium		2.10
Height of the skull at the commencement of the cavitas narium		0.38
Length of the femur		1.34
Length of the tibia		1.90
Smallest diameter of the radius near the distal extremity		0.14

By these measurements it is apparent that the tibia, radius and ulna and 1st phalange are equal in length. The humerus and 3rd phalange are also equal to each other, and so likewise are the metacarpus and femur equal to each other. If we also compare the smallest diameter of the radius, 0.14 inch, with its length, 1.90 inch, we find that the bone is $13\frac{8}{14}$ diameters long, and in *P. Macronyx (Bucklandi)* it is $13\frac{9}{32}$. We may therefore be enabled, by keeping these comparative measurements in view, to predict with a tolerable degree of certainty the spread of wing of any Pterodactyl of which we may find one or more of the principal bones of the wing, and especially if

we take into consideration the comparative length of each bone with regard to its total extension, as exhibited in the table of the dimensions of *P. longirostris*. In the case of the great specimens of radius we may arrive at their length in many cases, although the bone may be imperfect at even both terminations. Thus the diameter of the smallest portion of the bone formerly in the possession of the Earl of Enniskillen and figured by Prof. Owen, is .81 inch at the smallest portion of the shaft: this bone therefore, on the scale of $13\frac{1}{2}$ diameters to its length, should be 10.93 inches in length. The measurement of the smallest portion of the bone belonging to Mrs. Smith (Geol. Journ. vol. iv. pl. 2. fig. 1a) is .77 inch: we may therefore, by the same rule, conclude that its length was 10.39 inches when perfect. The length of the imperfect ulna beside it is 9.25 inches in the specimen. The diameter of the smallest portion of the bone (Geol. Journ. vol. ii. pl. 1. fig. 6) is .45 inch, which, in the proportion of $13\frac{1}{2}$ diameters to its length, will give 6.07 inches for its length. The width of the corresponding bone in the possession of Mr. Charles of Maidstone is 1.25 inch at the smallest diameter: by the same rule, therefore, the approximate length should be 16.87. The remains of the bone alongside of it is, although imperfect at both ends, actually 12.25 inches in length.

Upon these grounds therefore, in every case derived as much as possible from direct measurements from the skeletons of the respective species, I have given the following table of the dimensions of a series of species of Pterodactyls, the most interesting either from the state of perfection in which their remains have been found, or from the gigantic proportions which they present; and thus have endeavoured to realize to the mind an idea, as nearly as possible correct, of the dimensions of the animals when alive.

Table of the relative proportions of known species of *Pterodactylus*, with the length of each of the wing-bones and half of the width of the body.

	Humerus.	Radius and Ulna.	Carpus.	Metacarpus.	1st Phalange.	2nd Phalange.	3rd Phalange.	4th Phalange.	Half width of body.	Total expansion from tip to tip of wing.
P. brevirostris ...	in. 0.48	in. 0.75	in. 0.06	in. 0.52	in. 0.82	in. 0.76	in. 0.48	in. 0.35	ft. 0'19	in. 0 9
P. longirostris ...	1.25	1.90	0.13	1.34	1.90	1.75	1.25	1.17	0'47	1 10
P. crassirostris...	2.08	4.42	0.34	1.32	2.83	2.53	2.08	2.32	1'10	3 2
P. Bucklandi.....	3.25	4.25	0.40	3.75	3.91	4.83	3.25	3.00	1'06	4 7
P. grandis	3.75	5.70	0.39	4.02	5.70	5.50	2.75	3.51	1'42	5 5
P. giganteus.....	4.43	6.74	0.46	4.75	6.74	6.21	4.43	4.14	1'68	6 7
P. (Mrs. Smith's)	6.76	10.39	0.70	7.26	10.39	9.49	6.76	6.33	2.59	10 2
P. Cuvieri	10.99	16.87	1.14	11.79	16.87	15.56	10.99	10.29	4.22	16 6

In the above table I have presumed that the largest bones should be associated with the snout described as the type of *P. Cuvieri*, but the truth of this assignment of the bones belonging to Mr. Charles

can alone be determined by the acquisition of more complete specimens of the animal than those at present known.

In the construction of this table I have taken the proportions of *P. longirostris* as the foundation, as it is the only species from which I could get the measurements of all the bones of the wing from the same animal; but it must not be supposed that the restorations effected in the table will be absolutely correct at all times in its application, for we see that in *P. longirostris* the radius and first phalange are equal, but in *crassirostris* and *Bucklandi* this is not the case: the greatest discrepancy rests with *crassirostris*, while *Bucklandi* and *brevirostris* accord much more nearly with the proportions of *longirostris*; and if we may judge by the comparative difference between those bones in *longirostris* on the one part, and *Bucklandi* and *crassirostris* on the other, it may perhaps be fairly surmised that the greater length of wing would be found to exist in the long-nosed species, and consequently that *Bucklandi* will prove to belong to the short-nosed ones; and this also would seem to be indicated by what remains of the cervical vertebrae in the original specimen in the British Museum.

Prof. Owen, in treating of these animals in my late friend Mr. Dixon's work 'On the Geology and Fossils of the Tertiary and Cretaceous Formations of Sussex,' has thought proper to re-name *P. giganteus*, and designate it *P. conirostris*, Owen. I certainly did not lend my specimens to my late friend Mr. Dixon for the illustration of his work, with a view of having the name which I had assigned to this new and gigantic species subverted, and without in the slightest degree being consulted on the subject. Nor can I concur with the reasons given by Prof. Owen for thus re-naming it, as the name *giganteus* was not given, as stated by the learned Professor, "because certain bones of another and larger animal, of a different species, have been erroneously referred to it;" but, in truth, from its being the largest distinct species at that time known, exceeding *P. Bucklandi* (or *Macronyx*) by two feet in the spread of its wings, and *P. grandis* of Cuvier by above a foot. The beautiful specimen of radius and ulna in the possession of Mrs. Smith, and subsequently figured in my second paper, was at that time unknown to me, and the bone then in the possession of the Earl of Enniskillen was claimed by the Professor as that of a bird. I had therefore no other material than that in my own possession on which to base my name of *giganteus*.

If the learned Professor's reason for the proposed change of name is to hold good, that of exclusive fitness in specific nomenclature, then the one he proposes is also inappropriate, as it might be with equal propriety given to either *crassirostris* or *brevirostris*; or if specific names, based on comparisons of size, are to be extinguished, and new names given on the discovery of new species, there would be no end of the confusion generated; thus, as *P. brevirostris* is thicker in its proportions than *crassirostris*, they would require to exchange names, or the latter at least to be re-named; *medius* would no longer be *medius*, with the addition of our new species, and *grandis* would no longer be grand in comparison. Into what an unenviable state of confusion

should we not plunge nomenclature if we were to adopt the *practice* of the learned Professor, instead of the precepts so judiciously laid down by himself and others of the Committee of Nomenclature of the British Association, and which I quote as a justification on my part for my refusal to adopt the learned Professor's exchange of my name for the one he has proposed !

In page 4 of the Report, under the head of "Law of Priority the only effectual and just one," we find the following passages :—"It being admitted on all hands that words are only the conventional signs of ideas, it is evident that language can only attain its end effectually by being permanently established and generally recognized. This consideration ought, it would seem, to have checked those who are continually attempting to subvert the established language by substituting terms of their own coinage." "Now in zoology no one person can subsequently claim an authority equal to that possessed by the person who is the first to define a new genus or describe a new species ; and hence it is that the name originally given, even though it be inferior in point of elegance or expressiveness to those subsequently proposed, ought, as a general principle, to be permanently retained. To this consideration we ought to add the injustice of erasing the name originally selected by the person to whose labours we owe our first knowledge of the object." To these excellent principles the learned Professor has given the sanction of his signature. Prof. Owen, in the article on *Pterodactylus* in Mr. Dixon's work, has not quoted my observations on those Reptiles so fully as I could have wished ; inasmuch as he has adverted to the strongly-marked peculiarities of the bone-cells, which are the principal characters in the question at issue, in so slight a manner, as almost to induce me to imagine that he must have forgotten them entirely. I shall simply content myself in challenging Prof. Owen to produce any such general structure and proportions of the bone-cells from the skeleton of any recent or extinct bird as those existing in the long bone described as *Cimoliornis*, or to produce any such radius and ulna of a bird containing similar bone-cells as those in the possession of Mrs. Smith, and figured by me in my paper in the 'Quarterly Journal of the Geological Society for February 1848,' vol. iv. pl. 2.

On the subject of the strictures with which Prof. Owen has favoured me at the conclusion of his observations in Mr. Dixon's work, and how far I have been "wanting in a due comprehension of the subject, and have been a hindrance instead of a furtherance of true knowledge," I am content to leave to the judgement of those who may feel a sufficient degree of interest to induce them to peruse what I have written in my former papers on the Pterodactyles of the Chalk.

January 28, 1851.

R. H. Solly, Esq., F.R.S., in the Chair.

The following papers were read:—

1. **ON A NEW SPECIES OF PTERODACTYLE (PTERODACTYLUS COM-PRESSIROSTRIS, OWEN) FROM THE CHALK; WITH SOME REMARKS ON THE NOMENCLATURE OF THE PREVIOUSLY DESCRIBED SPECIES. BY PROF. OWEN, F.R.S.**

(*Reptilia, Pl. V.*)

The honour of having first made known the existence of remains of the Pterodactyle in the Chalk deposits belongs to James Scott Bowerbank, Esq., F.R.S. This indefatigable collector had the good fortune to receive in 1845, from the Kentish Chalk, the characteristic jaws and teeth, with part of the scapular arch and a few other bones, of a well-marked species of Pterodactyle, and the discovery was briefly recorded in the 'Quarterly Journal of the Geological Society of London,' and in the 'Proceedings' of the Society for May 14, 1845, with an illustrative plate (pl. 1).

Mr. Bowerbank concludes his notice by referring to a large fossil wing-bone from the chalk, previously described and figured by me in the 'Geological Transactions,' and remarks that, "if it should prove to belong to a Pterodactyle, the probable expansion of the wings would reach to at least eight or nine feet. Under these circumstances," he says, "I propose that the species described above shall be designated *Pterodactylus giganteus*." (*loc. cit. p. 8.*) Subsequent discoveries and observations have inclined the balance of probability in favour of the Pterodactylian nature of the fossils to which Mr. Bowerbank refers, but have shown them to belong to distinct species.

These fossils are not, indeed, amongst the characteristic parts of the flying reptile: one of them is the shaft of a long bone exhibiting those peculiarities of structure which are common to birds and pterodactyles; the other shows an articular extremity, which, in our present ignorance of those of the different bones of the Pterodactyle, has its nearest analogue in the distal trochlea of the bird's tibia. These two specimens, which are figured in the sixth volume of the Second Series of the 'Transactions of the Geological Society,' 1840, pl. 39. figs. 1 & 2, were transmitted to me by the Earl of Enniskillen and Dr. Buckland, as being "the bones of a bird" (p. 411), and my comparisons of them were limited to that class.

The idea of their possibly belonging to a Pterodactyle did occur to me, but it was dispelled by the following considerations. The act of flight—the most energetic mode of locomotion—demands a special modification of the Vertebrate organization, in that subkingdom, for its exertion. But in the class *Aves*, in which every system is more or less adapted and co-adjusted for this end, the laws of gravitation seem to forbid the successful exercise of the volant powers in species beyond a certain bulk; and when this exceeds that of the Condor or Albatros,

as, for example, in the Cassowary, the Emeu, or the Ostrich, although the organization is essentially that of the Vertebrate animal modified for flight, flight is impossible; and its immediate instruments, to the exercise of which all the rest of the system is more or less subordinated, are checked in their development; and, being unfitted for flight, they are not modified for any other use. There is not, perhaps, a more anomalous or suggestive phenomenon in nature than a bird which cannot fly! A small section of the Mammalia is modified for flight; but the plan of the organization of that warm-blooded class being less directly adapted for flight than that of birds, the weight and bulk of the body which may be raised and transported through the air are restricted to a lower range, and the largest frugivorous Bat (*Pteropus*) does not exceed the Raven in size. The Reptilian modification of the Vertebrate type would seem to be still less fitted for any special adjustment to aerial locomotion; and in the present day we know of no species of the class that can sustain itself in the air which equals a Sparrow in size. And the species in question—the little *Draco volans*—sails rather than flies, upborne by its outstretched costal parachute in its oblique leaps from bough to bough.

Of the remarkable reptiles now extinct, which, like the Bats, had their anterior members modified for plying a broad membranous wing, no species had been discovered prior to 1840 which surpassed the largest of the *Pteropi*, or Flying-Foxes, in the spread of those wings, and there was, *a priori*, a physiological improbability that the cold-blooded organization of a Reptile should by any secondary modification be made to effect more in the way of flight, or be able to raise a larger mass into the air, than could be done by the warm-blooded Mammal under an analogous special adaptation. When, therefore, the supposed bird's bone (Geol. Trans. 1840, pl. 39. fig. 1) was first submitted to me by Dr. Buckland, which on the Pterodactyle hypothesis could not be the humerus, but must have been one of the smaller bones of the wing, its size seemed decisive against its reference to an animal of flight having a cold-blooded organization. The subsequent discovery of the portion of the skull of the Pterodactyle, described by Mr. Bowerbank at the last meeting of the Society (Jan. 14), shows that the resources of Creative power in past time surpass the calculations that are founded upon actual nature.

It is only the practised Comparative Anatomist that can fully realize the difficulty of the attempt to resolve a palaeontological problem from such data as the two fragments of long bones first submitted to me in 1840. He alone can adequately appreciate the amount of research involved in such a generalization as that "there is no bird now known, north of the equator, with which the fossils can be compared;" and when, after a wearying progress through an extensive class, the species is at length found to which the nearest resemblance is made by the fragmentary fossil, and the differences are conscientiously pointed out—as when, in reference to the humerus of the Albatros, I stated that "it differs therefrom in the more marked angles which bound the three sides"—the genuine worker and searcher after truth may conceive the feelings with which I find myself misrepresented as

having regarded the specimens "as belonging to an extinct species of Albatros." My reference of the bones even to the longipennate tribe of natatorial birds is stated hypothetically and with due caution: "On the supposition that this fragment of bone is the shaft of the humerus, its length and comparative straightness would prove it to have belonged to one of the longipennate natatorial birds equalling in size the Albatros." (*loc. cit.* p. 411.)

Since the discovery has been made of the manifestly characteristic parts of the genus *Pterodactylus* in the Burham chalk-pit, it has been objected that the bones first discovered there, and described by me as resembling birds of flight, "are so extremely thin, as to render it most improbable that they could ever have sustained such an instrument of flight as the powerful wing of the Albatros, or of any other bird: their tenuity is in fact such," says the *ex post facto* Objector, "as to point out their adaptation to support an expanded membrane, but not pinions *."

The reply to this assertion need only be a simple reference to nature: sections of the wing-bones of birds may be seen in the Museum of the Royal College of Surgeons, and have been exposed to view, since the discovery of their structure by the Founder of that Collection, in every Museum of Comparative Anatomy worthy to be so called.

To expose the gratuitous character of the objection above cited, I have placed on the table a section of the very bone that directly sustains the large quill-feathers in the Pelican; its parietes are only half as thin as those of the antibrachial bone of the great Pterodactyle which is figured in my 'History of British Fossil Reptiles,' pl. 4, and is not thicker than those of the bone figured in the Geological Transactions, 1840, above cited.

HUNTER, who had obtained some of the long bones with thin walls and a wide cavity from the Stonesfield slate, has entered them in his MS. Catalogue of Fossils as the "Bones of Birds," and perhaps no practical anatomist had had greater experience in the degree of tenuity presented by the compact walls of the large air-cavities of the bones in that class. Of all the modifications of the dermal system for combining extent of surface with lightness of material, the expanded feather has been generally deemed the consummation. Well might the eloquent Paley exclaim, "Every feather is a mechanical wonder: their disposition all inclined backwards, the down about the stem, the overlapping of their tips, their different configuration in different parts, not to mention the variety of their colours, constitute a vestment for the body so beautiful and so appropriate to the life which the animal is to lead, as that, I think, we should have had no conception of anything equally perfect, if we had never seen it, or can imagine anything more so." It was reserved for the author of the 'Wonders of Geology' to prefer the leathern wing of the Bat and Pterodactyle as the lighter form, and to discover that such a structure as is displayed in the bone described and figured in the 'Geol. Trans.'

* Mantell, 'Wonders of Geology,' 1848, vol. i. p. 441.

vol. vi. pl. 39, was a most improbable one to have sustained a powerful wing of any bird!* Let me not be supposed, however, to be concerned in excusing my own mistake; I am only reducing the unamiable exaggeration of it. Above all things, in our attempt to gain a prospect of an unknown world by the difficult ascent of the fragmentary ruins of a former temple of life, we ought to note the successful efforts, as well as the occasional deviations from the right track, with an equal glance, and record them with a strict regard to truth. The existence of a species of Albatros, or of any other actual genus of bird during the period of the Middle Chalk, would be truly a wonder of Geology; not so the existence of a bird of the longipennate family.

I still think it for the interest of science, in the present limited extent of induction from microscopic observation, to offer a warning against a too hasty and implicit confidence in the forms and proportions of the Purkingean or radiated corpuscles of bone, as demonstrative of such minor groups of a class as that of the genus *Pterodactylus*. Such a statement as that "these cells in *Birds* have a breadth in proportion to their length of from one to four or five; while in *Reptiles* the length exceeds the breadth ten or twelve times," only betrays the limited experience of the assertor. In the dermal plates of the Tortoise, e. g., the average breadth of the bone-cell to its length is as one to six, and single ones might be selected of greater breadth.

With the exception of one restricted family of Ruminants, every Mammal, the blood-discs of which have been submitted to examination, has been found to possess those particles of a circular form: in the *Camelidae* they are elliptical, as in birds and reptiles. The bone-cells have already shown a greater range of variety in the Vertebrate series than the blood-discs. Is it then a too scrupulous reticence to require the evidence of microscopic structure of a bone to be corroborated by other testimony of a plainer kind, before hastening to an absolute determination of its nature, as has been done with regard to the Wealden bone, figured in the Geol. Trans., 2nd Series, vol. v. pl. 13. fig. 6†? As a matter of fact, the existence of Pterodactylian remains in the chalk was not surmised through any observation of the microscopic structure of bones that are liable to be mistaken for those of birds, but was first plainly proved by the characteristic portions of the Pterodactyle defined by Mr. Bowerbank, as follows, in his original communication of this discovery to the Geological Society of London, May 14, 1845:—

"I have recently obtained from the Upper Chalk ‡ of Kent some

* Mantell, 'Wonders,' &c. ed. 1848, vol. i. p. 441.

† Compare, for example, two of the longest of the cells figured by Mr. Bowerbank in pl. 1. fig. 9, 'Quarterly Journal of the Geological Society,' vol. iv. as those of a bird, with two of the widest of the cells figured in fig. 1 of the same plate as those of the Pterodactyle; and contrast the want of parallelism in the bone-cells of the Wealden bone, fig. 9, with the parallelism of the long axes of the cells in that of the Albatros, fig. 3.

‡ Mr. Toulmin Smith, in an able paper "On the Formation of the Flints of the

remains of a large species of *Pterodactylus*. The bones consist of—

“1. The fore part of the head as far as about the middle of the *cavitas narium*, with a corresponding portion of the under jaws, many of the teeth remaining in their sockets.

“2. A fragment of the bone of the same animal, apparently a part of the coracoid.

“3. A portion of what appears to be one of the bones of the auricular digit, from a chalk-pit at Halling.

“4. A portion of a similar bone, from the same locality as No. 1.

“5. The head of a long bone, probably the tibia, belonging to the same animal as the head, No. 1.

“6. A more perfect bone of the same description, not from the same animal, but found at Halling.”

In a subsequent communication, dated December 1845, Mr. Bowerbank states with regard to the specimens Nos. 5 and 6, which he supposed to be parts of a tibia, that “on a more careful comparison with the figures of *Pterodactylus* by Goldfuss, I am inclined to believe they are more likely to be portions of the tibia.”

With respect to the long bone, No. 6 in the above list, comparing it with that figured in the Geol. Trans., 2nd Series, vol. vi. pl. 39. fig. 1, and referred by me to *Cimoliornis diomedea*, Mr. Bowerbank writes:—

“Although the two specimens differ greatly in size, there is so strong a resemblance between them in the form and regularity of the shaft, and in the comparative substance of the bony structure, as to render it exceedingly probable that they belong to the same class of animals;” and he concludes by remarking, that “If the part of the head in my possession (see fig. 1) be supposed similar in its proportions to that of *Pterodactylus crassirostris*,—and there appears but little difference in that respect,—it would indicate an animal of comparatively enormous size. The length of the head, from the tip of the nose to the basal extremity of the skull, of *Pt. crassirostris* is about $4\frac{1}{2}$ inches, while my specimen would be, as nearly as can be estimated, $9\frac{1}{2}$ inches. According to the restoration of the animal by Goldfuss, *Pt. crassirostris* would measure as nearly as possible three feet from tip to tip of the wings, and it is probable that the species now described would measure at least six feet, from one extremity of the expanded wings to the other; but if it should hereafter prove that the bone described and figured by Prof. Owen belongs to a Pterodactyle, the probable expansion of the wings would reach to at least eight or nine feet. Under these circumstances I propose that the species described above shall be designated *Pterodactylus giganteus*.” (Quarterly Geol. Journ. vol. ii. p. 8.)

In a subsequent memoir, read June 9, 1847, and published in the ‘Quarterly Journal of the Geological Society,’ vol. iv. February 1848, Mr. Bowerbank gives figures of the ‘bone-cells’ from the jaw of a

Upper Chalk,” in the ‘Annals of Natural History,’ vol. xx. p. 295, affirms that no upper chalk exists in the localities whence the above-defined specimens came. They are from the “Middle Chalk.”

Pterodactyle (pl. 1. fig. 1), from the shaft of the bone in question (*ib. fig. 2*), and from the femur of a recent Albatros (*ib. fig. 3*), in corroboration of the required proof: and he adds, "Fortunately the two fine specimens from the rich collection of Mrs. Smith of Tonbridge Wells, represented by fig. 1. pl. 2, in a great measure justify this conclusion; and in the bone *a*, which is apparently the corresponding bone to the one represented by fig. 1 in Prof. Owen's paper, the head is very nearly in a perfect state of preservation." (*op. cit. p. 5.*) Mr. Bowerbank, in his explanation of plate 2, describes the two fine specimens above mentioned as "Fig. 1. Radius and ulna of *Pterodactylus giganteus*, in the cabinet of Mrs. Smith of Tonbridge Wells." (*tom. cit. p. 10.*) He proceeds to state, "There are two other similar bones, imbedded side by side, in the collection of Mr. Charles of Maidstone, of still greater dimensions than those from the cabinet of Mrs. Smith;" and he assigns his grounds for the conclusion, that "the animal to which such bones belonged could, therefore, have scarcely measured less than fifteen or sixteen feet from tip to tip of its expanded wings."

The Committee of the British Association for the Reform and Regulation of Zoological Nomenclature, amongst other excellent rules, have decided that, "A name which is glaringly false shall be changed" (Report, p. 113). I submit that this is the case when the name *giganteus* is proposed for a species less than half the size of others previously discovered. Now, although those remains of the truly gigantic Pterodactyles had not been demonstrated to be such, yet they were suspected so to be by Mr. Bowerbank when he proposed the name *giganteus*; and the name is in fact proposed, subject to the condition of that demonstration, and under the evident belief that they belonged to the same species as the obvious Pterodactyle remains he was describing. He says, "Under these circumstances I propose that the species shall be designated '*giganteus*'", and the circumstances referred to are the probable case that the bones, which from their large size I had supposed to belong to a bird, should prove to belong to a Pterodactyle.

The Committee for the Reform of Zoological Nomenclature next proceed to determine that, "Names not clearly defined may be changed. Unless a species or group is intelligibly defined when the name is given, it cannot be recognised by others, and the signification of the name is consequently lost. Two things are necessary before a zoological term can acquire any authority, viz. *definition* and *publication*. Definition properly implies a distinct exposition of essential characters, and in all cases we conceive this to be indispensable." (Report, pp. 113, 114.) Now with regard to the *Pterodactylus giganteus*, Mr. Bowerbank had unreservedly applied the term to the species to which the long wing-bone first described by me might appertain, under the circumstances of its being proved to belong to a Pterodactyle; inasmuch as he had figured two similar and equal-sized bones in the 'Quarterly Journal of the Geological Society,' vol. iv. pl. 2. fig. 1 (Proceedings of the Society for June 9, 1847), as the "radius and ulna

of *Pterodactylus giganteus*." So far as a species can be intelligibly defined by figures, that to which the term *giganteus* was in 1845 provisionally, and in 1847 absolutely applied, seemed to be clearly enough pointed out by the plate 2 in the work above cited. But, with the large bones appropriately designated by the term *giganteus*, some parts of a smaller Pterodactyle, including the portions of jaws first announcing the genus in the Chalk, had been associated under the same name. Supposing those bones to have belonged to a young individual of the *Pterodactylus giganteus*, no difficulty or confusion would arise. After instituting, however, a rigid comparison of these specimens, when drawing up my Descriptions for Mr. Dixon's work, I was compelled to arrive at the conclusion that the parts figured by Mr. Bowerbank in plate 2, figs. 1 & 2, of vol. ii. of the 'Quarterly Geological Journal,' and the parts figured in plate 2, figs. 1 *a* & *b*, of vol. iv. of the same Journal, both assigned by Mr. Bowerbank to the *Pterodactylus giganteus*, belonged to two distinct species. The portions of the scapula and coracoid of the Pterodactyle (pl. 1. fig. 2, *tom. cit.*) indicated by their complete ankylosis that they had not been part of a young individual of the species to which the large antibrachial bones (pl. 2. fig. 1 *a* & *b*, *tom. cit.*) belonged; although they might well appertain to the species to which the jaws (pl. 1. fig. 1) belonged. Two species of Pterodactyle were plainly indicated, as I have shown in the above-cited work, by my lamented friend Mr. Dixon, 'On the Tertiary and Cretaceous Deposits of Sussex,' 4to, p. 402. The same name could not be retained for both, and it was in obedience to this necessity, and not with any idea of detracting an iota from the merit of Mr. Bowerbank's original announcement of the existence of a Pterodactyle in the chalk, that I proposed the name of *conirostris* for the smaller species, then for the first time distinctly defined and distinguished from the larger remains to which the name *giganteus* had also been given by Mr. Bowerbank. I proposed the name, moreover, provisionally and with submission to the 'Committee for the Reform of Zoological Nomenclature,' according to whose rules I believed myself to be guided.

My conclusions as to the specific distinction of the remains of the smaller Pterodactyle (pl. 1, *tom. cit.* 1845) from those figured in plate 2. *tom. cit.* 1848, have received full confirmation by the valuable discovery of the portion of the cranium of the truly gigantic Pterodactyle, about to be described, to which they belonged; and it is certainly to be wished that, in determining to assign to Mrs. Smith's specimens the name of '*giganteus*,' Mr. Bowerbank should have conformed to the following equitable rule of the 'Committee of Nomenclature':—"The author who *first* describes and names a species, which forms the groundwork of later generalizations, possesses a higher claim to have his name recorded than he who afterwards defines a genus which is found to embrace that species. By giving the authority for the *specific* name in preference to all others, the inquirer is referred *directly* to the original description, habitat, &c. of the species, and is at the same time reminded of the date of its discovery." (Reports of the British Association, 1842, p. 120.)

Now the species which I originally described under the name of *Cimoliornis diomedaeus* comes precisely under this category: it has formed the groundwork of later generalizations, which have led to its being embraced by another genus. In this case the Committee of Nomenclature, whilst determining that the specific name should be retained, recommend that the describer should "append to the original authority for the species, when not applying to the genus also, some distinctive mark, such as (sp.), implying an exclusive reference to the specific name." In conformity with the above recommendation, the gigantic species of *Pterodactyle*, of which parts have been described by Mr. Bowerbank, and parts previously by myself, would be entered into the Zoological Catalogues as follows:—

Pterodactylus diomedaeus, Owen (sp.), Proceedings of the Zoological Society, January 1851.

Cimoliornis diomedaeus, Ibid., British Fossil Mammals and Birds, p. 545, cuts 230, 231 (1843-1846).

Osteornis diomedaeus, Gervais, Thèse sur les Oiseaux Fossiles, 8vo, p. 38 (1844).

Pterodactylus giganteus, Bowerbank, Quarterly Journal of the Geological Society, vol. iv. p. 10. pl. 2. figs. 1 & 4 (1848).

Leaving, however, the question of names, regarding which I have no personal feeling except that they should indicate their objects without ambiguity or obvious impropriety, I proceed to lay before the same Society to which Mr. Bowerbank has communicated his last interesting and important discovery, similar evidence of a third species of *Pterodactyle* from the chalk, intermediate in size between the species of which the jaws were figured as the *Pterodactylus giganteus* in 1845, and the truly gigantic species which he has named *Pterodactylus Cuvieri*.

The specimens, which consist of two portions of the upper jaw, form part of that gentleman's collection, and were in fact exhibited on the table, but unnoticed, at our last meeting, their true nature not having been recognised. The chief portion might well indeed be mistaken, at first sight, for a crushed portion of an ordinary long bone; and it was not until after a close comparison of several specimens of these rare and interesting remains of *Pterodactyles*, kindly confided to me by Mrs. Smith of Tonbridge Wells, Mr. Toulmin Smith of Highgate, Mr. Charles of Maidstone, and by Mr. Bowerbank himself, for description in my forthcoming 'Monograph on the Fossil Reptiles of the Chalk,' that I discovered them to be parts of a skull of an undescribed species of *Pterodactyle*.

In order to make this understood, it will be necessary to premise a few words on the *Pterodactyles* in general, and on some of the characters of the jaw of the *Pterodactylus Cuvieri* in particular.

The Order *Pterosauria* includes species of flying reptiles so modified in regard to the structure and proportions of the skull, the disposition of the teeth, and the development of the tail, as to be referable even according to the partial knowledge we now possess of this once extensive group, to different genera.

M. Von Meyer *e. g.* primarily divides the Order into—

A. *DIARTHRI*, with a two-jointed wing-finger.

Ex. *Pterodactylus (Ornithopterus) Lavateri*.

B. *TETRARTHRI*, with a four-jointed wing-finger.

Ex. All the other known species of the order.

These again are subdivided into—

1. *Dentirostres*. Jaws armed with teeth to their ends; a bony sclerotic ring; scapula and coracoid not confluent with one another *; a short moveable tail.

Ex. *Pterodactylus* proper.

2. *Subulirostres*. Jaws with their ends produced into an edentulous point, probably sheathed with bone; no bony sclerotic; scapula and coracoid confluent; a long and stiff tail.

Ex. *Pterodactylus (Rhamphorhynchus) Gemmingi* †.

The extremity of the upper jaw of the *Pterodactylus Cuvieri* is sufficiently perfect to demonstrate that it had a pair of approximated alveoli close to its termination, and we may therefore refer it to the Dentirostral division.

In this division, however, there are species which present such different proportions of the beak, accompanied by differences in the relative extent of the dental series, as would without doubt lead to their allocation in distinct genera, were they the living or recent subjects of the modern Erpetologist. In the *Pterodactylus longirostris*, the first species discovered and made known by Collini in 1784 ‡, the jaws are of extreme length and tenuity, and the alveoli of the upper jaw do not extend so far back as the nostril. In the *Pterodactylus crassirostris*, Goldfuss §, on the other hand, the jaws are short, thick, and obtusely terminated, and the alveoli of the upper jaw reach as far back as the middle of the vacuity which intervenes between the nostril and the orbit, and which Goldfuss terms the 'cavitas intermedia.'

In the solid or imperforate part of the upper jaw anterior to the nostril, the *Pterodactylus longirostris* has twelve long, subcompressed teeth, followed by a few of smaller size: the same part of the jaw in the *Pt. crassirostris* has but six teeth, of which the first four are close together at the end of the jaw, and the first three shorter than the rest. The *cavitas intermedia* in *Pt. longirostris* is much smaller than the nostril; in the *Pt. crassirostris* it is larger than the nostril. Were these two species of dentirostral *Pterosauria* to be taken, as by the modern Erpetologist they assuredly would, to be types of two

* The condition of the scapular arch in the *Pt. giganteus*, Bow., *Pt. conirostris* mihi, demonstrates the fallacy of this character.

† *Palaeontographia*, Heft 1, 4to. 1846, p. 19.

‡ *Acta Academiæ Theodoro-Palatinæ*, V. p. 58, tab. 5.

§ *Beiträge zur Kenntniß verschiedener Reptilien der Vorwelt*, 4to. 1831, sec. 1. tab. 7, 8, 9.

distinct genera, the name *Pterodactylus* should be retained for the longirostral species, as including the first-discovered specimen and type of the genus; and the crassirostral species should be grouped together under some other generic name.

The specimen of gigantic Pterodactyle described by Mr. Bowerbank at the last meeting of the Society consists of the solid anterior end, *i. e.* of the imperforate continuous bony walls, of a jaw, compressed and decreasing in depth, at first rapidly, then more gradually, to an obtusely-pointed extremity. As the symphysis of the lower jaw is long and the original joint obliterated, and its depth somewhat rapidly increases by the development of its lower and back part into a kind of ridge in some smaller Pterodactyles, the present specimen, so far as these characters go, might be referred to the lower jaw, and its relatively inferior depth to the upper jaw in the *Pt. conirostris* would seem to lead to that conclusion. But the present is plainly a species which has a longer and more slender snout in proportion to its size, and the convex curve formed by the alveolar border, slight as it is, decides it to be part of the upper jaw. The lower jaw, moreover, might be expected, by the analogy of the smaller Pterodactyles, to be flatter or less acute below the end of the symphysis.

The specimen of *Pt. Cuvieri* consists of the anterior extremity of the upper jaw, of seven inches in extent, without any trace of the nasal or any other natural perforation of its upper or lateral parietes, and corresponds with the parts marked *a*, *b*, in figs. 10 & 11. From the number of teeth contained in this part, the *Pt. Cuvieri* presents a much closer resemblance to the *Pt. longirostris* than to the *Pt. crassirostris*; and if the entire skull were restored according to the proportions of the *Pt. longirostris*, it would be twenty-eight inches in length.

But nature seems never to retain the same proportions in species that differ materially in bulk. The great *Diprotodon*, with the dental and cranial characters of a Kangaroo, does not retain the same length of hinder limbs as its living homologue; the laws of gravity forbid the saltatory mode of locomotion to a Herbivore of the bulk of a Rhinoceros; and accordingly, whilst the hind-legs are shortened the fore-limbs are lengthened, and both are made more robust in the *Diprotodon* than in the Kangaroo. The change of proportions of the limbs of the Sloths is equally striking in those extinct species which were too bulky to climb, *e. g.* the *Megatherium* and *Mylodon*. We may therefore infer, with a high degree of probability, when a longirostral Pterodactyle much surpassed in bulk the species so called 'par excellence,' that the same proportions were not maintained in the length of the jaws; and that the species to which the fine fragment belonged, far as it has exceeded our previous ideas of the bulk of a flying reptile, did not sustain and carry through the air a head of two feet four inches in length, or nearly double the size of that of the Pelican.

Although the fractured hinder part of the jaw of the *Pt. Cuvieri* shows no trace of the commencement of the wide nasal aperture, there is a plain indication that the jaws were less prolonged than in the *Pt.*

longirostris, in the more rapid increase of the vertical breadth of the jaw. Opposite the ninth tooth, *e.g.*, the depth of the jaw equals two-fifths of the length in advance of that tooth, whilst in the *Pt. longirostris* it is only two-sevenths. The contour of the upper border of the jaw in the *Pt. Cuvieri* differs from that in both the *Pt. longirostris*, *Pt. crassirostris*, and *Pt. Gemmingi*, in sinking more suddenly opposite the ninth, eighth and seventh teeth, than it does along the more advanced part of the jaw; a character which, while it affords a good specific distinction from any of those species, indicates the hinder parts of the head that are wanting in the present specimen to have been shorter and deeper than in the *Pt. longirostris*.

The first pair of alveoli almost meet at the anterior extremity of the jaw, and their outlet is directed obliquely forwards and downwards; the obtuse end of the premaxillary above these alveoli is about two lines across. The palate quickly expands to a width of three lines between the second alveoli, then to a width of four lines between the fourth alveoli, and more gradually, after the ninth alveoli, to a width of six lines between the eleventh alveoli: here the palate appears to have been slightly crushed; but in the rest of its extent it presents its natural form, being traversed longitudinally by a moderate median ridge, on each side of which it is slightly concave transversely. It is perforated by a few small irregular vascular foramina. There are no orifices on the inner side of the alveoli; the successional teeth emerge, as in the Crocodiles, from the old sockets, and not, as in certain Mammalia and Fishes, by foramina distinct from them. The second and third alveoli are the largest; the fourth, fifth and sixth the smallest, yet they are more than half the size of the foregoing, with which the rest are nearly equal. The outlets of the alveoli are elliptical, and they form prominences at the side of the jaw, or rather the jaw sinks gently in between the alveoli, and is continued into the bony palate without any ridge, the vertical wall bending round to form the horizontal plate. The greatest breadth of the under surface of the jaw, taken from the outside of the alveoli, varies only from seven lines across the third pair to nine lines across the eleventh pair of alveoli; and from the narrow base the sides of the jaw converge with a slight convexity outwards at the anterior half of the fragment, but are almost plane at the deeper posterior half, where they seem to have met at one acute superior ridge; indeed such a ridge is continued to within an inch of the fore part of the jaw, where the upper border becomes more obtuse.

The whole portion of the jaw appears to consist of one uninterrupted bone—the premaxillary; the delicate crust of osseous substance, as thin as paper, is traversed by many irregular cracks and fissures, but there is no recognizable suture marking off the limits of a maxillary or nasal bone. The bone offers to the naked eye a fine fibrous structure, so fine as to produce almost a silken aspect, the fibres or striae being longitudinal, and impressed at intervals of from two to six lines by small vascular foramina.

Having premised so much with reference to the characters of the

Pt. Cuvieri, I proceed to the description of the distinct species, for which I propose the name of *Pterodactylus compressirostris*.

PTERODACTYLUS COMPRESSIROSTRIS, Owen.

(*Reptilia, Pl. V. figs. 1, 2 & 3.*)

This species is represented by two portions of the upper jaw, obtained from the Middle Chalk of Kent, the hinder and larger of which includes the beginning of the external nostril (figs. 1 & 2, *n*). The depth of the jaw at this part is fourteen lines, whence it gradually decreases to a depth of ten lines at a distance of three inches in advance of this, indicating a jaw as long and slender as in the *Pt. longirostris*, supposing the same degree of convergence of the straight outlines of the upper and alveolar borders of the jaw to have been preserved to its anterior end: that this was actually the case is rendered most probable by the proportions of the smaller anterior part of the jaw (figs. 1', 2', 3'), obtained from the same pit, if not from the same block of chalk, and which, with a vertical depth of seven lines at its hinder part, decreases to one of six lines in an extent of one inch and a half in advance of that part. The sides of the jaw as they rise from the alveolar border incline a little outwards before they converge to meet at the upper border. This gives a very narrow ovoid section at the fore part of the larger fragment (fig. 2), the greatest diameter at its lower half being four lines, and the sides meeting above at a slightly obtuse ridge. This very gradually widens as the jaw recedes backwards, where the entireness of the walls of the smoothly convex upper part of the jaw proves that the narrowness of that part is not due to accidental crushing. Had that been the case, the thin parietes arching above from one side to the other would have been cracked. The only evidence of the compression to which the deep sides of the jaw have been subject is seen in the bending in of the wall above the alveoli, close to the upper ridge at the fore part of the fragment.

In an extent of alveolar border of three and a half inches there are eleven sockets, the anterior one on the right side retaining the fractured base of a tooth: the alveoli are separated by intervals of about one and a half times their own diameter; their outlets are elliptical, and indicate the compressed form of the teeth: they are about two lines in long diameter at the fore part of this fragment, but diminish as they are placed more backwards, the last two being developed beneath the external nostril. The bony palate is extremely narrow, and presents in the larger portion (fig. 3) a median smooth convex rising between two longitudinal channels, which are bounded externally by the inner wall of the alveolar border. There is no trace of a median suture in the longitudinal convexity. The breadth of the palate at the back part of the fragment is eight lines; at the fore part it has gradually contracted to less than three lines, but it is somewhat crushed here. The naso-palatine aperture, *p*, commences about half a line in advance of the external nostril, three inches behind the fore part of the larger portion (fig. 3) of the upper jaw; which exemplifies the characteristic extent of the imperforate bony palate formed by the

long single premaxillary bone in the genus *Pterodactylus*. The fragment from the more advanced part of the jaw (fig. 3') contains five pairs of alveoli in an extent of two inches, these alveoli being rather larger and closer together than in the hinder part of the jaw. Owing to the compression which the present portion has undergone, the orifices of the alveoli are turned outwards, the bony palate being pressed down between the two rows, and showing, as the probable result of this pressure, a median groove between two longitudinal convex ridges; but the bone is entire and imperforate.

The form of the upper jaw in the present remarkable species differs widely from that of the two previously known species from the chalk, in its much greater elongation and its greater narrowness; and from the *Pt. Cuvieri*, in the straight course of the upper border of the jaw, as it gradually converges towards the straight lower border in advancing to the anterior end of the jaw. The alveoli, and consequently the teeth, are relatively smaller in proportion to the depth of the jaw than in the *Pt. Cuvieri*, and are more numerous than in the *Pt. giganteus*; they are probably also more numerous than in the *Pt. Cuvieri*; although, as the whole extent of the jaw anterior to the nostril is not yet known in that species, it would be premature to express a decided opinion on that point. As we may reasonably calculate from the fragments preserved (Pl. II. figs. 1, 2, 3), that the jaw of the *Pt. compressirostris* extended seven inches in front of the nostril, it could not have contained less than twenty pairs of alveoli, according to the number and arrangement of those in the two portions preserved.

The osseous walls in both portions present the characteristic compactness and extreme thinness of the bones of the skull of the genus: the fine longitudinal striae of the outer surface are more continuous than in the *Pt. Cuvieri*, in which they seem to be produced by a succession of fine vascular orifices produced into grooves. The conspicuous vascular orifices are almost all confined to the vicinity of the alveoli in the *Pt. compressirostris*. This species belongs, more decidedly than the *Pt. Cuvieri*, to the 'longirostral' section of the *Pterosauria*: whether it had an edentulous prolongation of the fore part of the upper and lower jaw remains to be proved.

In attempting to form a conception of the total length of the head of the very remarkable species of Pterodactyle represented by the portions of jaw above described, we should be more justified by their form in adopting the proportions of that of the *Pt. longirostris* than in the case of the *Pt. Cuvieri*: but allowing that the external nostril may have been of somewhat less extent than in the *Pt. longirostris*, we may still assign a length of from fourteen to sixteen inches to the skull of the Pterodactyle in question.

It could not have been anticipated that the first three portions of Pterodactylian skull—almost the only portions that have yet been discovered in the cretaceous formations—should have presented such well-marked distinctive characters, one from the other, as are described and illustrated in Mr. Bowerbank's Memoirs and in the present communication. Such, nevertheless, are the facts: and, however improbable it may appear, on the doctrine of chances, to those not con-

versant with the fixed relations of osteological and dental characters, that the three corresponding parts of three Pterodactyles for the first time discovered, should be appropriated to three distinct species, I have no other alternative, in obedience to the indications of nature, than to adopt such determination *.

2. DESCRIPTION OF TWO NEW GENERA AND SOME NEW SPECIES OF SCUTELLIDÆ AND ECHINOLAMPIDÆ IN THE COLLECTION OF THE BRITISH MUSEUM. BY JOHN EDWARD GRAY, Esq., F.R.S., P.B.S. ETC.

The collection of the British Museum is extremely rich in species of recent *Echinoids*, and fortunate in possessing long series of different ages of several of the species.

Having been recently occupied in arranging and forming a catalogue of these animals, I transmitted to the 'Annals of Natural History' for February a description of several genera and species of *Spatangidæ*.

MM. Agassiz and Desor having recently published, in the Monograph of Echini and other papers on these animals, all the species of these two families then known to them, and as they had every facility for examining the British Museum specimens, the species now to be described are but few in number.

Fam. 1. SCUTELLIDÆ.

Genus ECHINANTHUS.

Among the species which have the base concave, of which *E. roseus* may be considered the type, are to be added—

1. ECHINANTHUS AUSTRALASIÆ.

Vent beneath, at a little distance from the edge; back very convex

* The same criticism or objection may be offered to the conclusions in the text, as the following one, which was called forth by my determinations of the species of *Balænodon* found in the red crag. "The specimens exhibited by Prof. Henslow were only eleven in number; so that, without allowing anything for the circumstance of each whale having *two* tympanic bones, and the probability of some of the above being in *pairs*, we have the first twelve determinable cetaceous bones discovered in the red crag appropriated to no less than *five* species. I have no pretensions to call in question the decision of Prof. Owen upon osteological grounds, but I must own that I am disposed, upon the doctrine of chances, to consider it hardly probable that these determinations are accurate."—*Searles V. Wood*, Feb. 16, 1844, London Geol. Journal, p. 35. The *fifth* species is a gratuitous addition to the four described by me, the determinate characters of which have been confirmed by numerous additional discoveries. Mr. Wood should have remembered, before he attempted to discredit the determinations from anatomy, and to substitute the numerical test, that the second mammalian fossil from the oolite, although a lower jaw, like the first, was of a different species, and that of five subsequently discovered unequivocal mammalian remains from Stonesfield, *all* are parts of the lower jaw, whilst two of them demonstrate a *third* species. Very improbable this to him, on the doctrine of chances; but only showing, as Sir Charles Lyell has remarked, "the fragmentary manner in which the memorials of an ancient terrestrial fauna are handed down to us."

in the middle; upper margin rather flattened, with a slight concavity at the end of the ambulacra; under side flat near the margin, deeply concave in the middle; spines of the under side near mouth very fine.

Hab. Australia; N.S.W., Brisbane Water.

2. **ECHINANTHUS TESTUDINARIUS.**

Vent beneath a little within the edge, depressed; back slightly raised, evenly convex; under surface rather concave from the edge.

Hab. Indian Ocean; Borneo.

3. **ECHINANTHUS OBLONGUS.**

Ovate-oblong, elongate, rounded at the end; sides thick, rounded; back depressed round the end of the ambulacra; crown rather convex; ambulacra ovate, lanceolate, broad, and closed at the end; under side concave nearly to the edge; ambulacral grooves indistinct; vent near the margin.

Hab. Philippines; Siquijor.

4. **ECHINANTHUS PRODUCTUS.**

Shell ovate, elongate, the hinder end produced and flattened, the edge rather thick, thinner behind; the ambulacral petal broad, the bands not quite united at the end; under side concave to the margin; vent near the margin.

Hab. —?

5. **ECHINANTHUS COLEÆ.**

Shell ovate, subpentagonal, depressed; margin thick, rounded; back depressed as far as the end of the ambulacra, and then rather convex in the middle, the under side concave nearly to the edge; ambulacral petal ovate lanceolate, closed at the end; vent near the margin.

Hab. Mauritius. Lady Mary Cole.

To those which have a flat base may be added—

6. **ECHINANTHUS EXPLANATUS.**

Depressed, much expanded, centre of the back rather convex; ambulacra occupying rather more than half the space between the vertex and margin, the lines of pores of the anterior pair and posterior odd one far apart at the end; cavity with thin concentric lines of short compressed columns near the margin; jaws depressed.

Hab. Mauritius?

Genus **ROTULA**.

The British Museum series induces me to believe that *Rotula digitata* of Agassiz is not distinct from *R. Rumphii*, as M. Agassiz first considered it to be.

Genus **ECHINODISCUS**.

I cannot find any permanent difference to distinguish *Lobophora bifissa* from *L. aurita*; they are found together in the same habitat in the Red Sea.

Genus MELLITA.

The larger spines on the back of this, the former, and succeeding genus are short, equal in size, and furnished with a more or less spherical head.

The Museum series of specimens show a very gradual passage between the *Echini* which have been called *Mellita testudinaria* and *M. quinquefora* by Agassiz.

The species which have six slits on the disc are found on the coast of Tropical America, and others on the shores of the Red Sea; I believe they form two species, which appear to have been confounded under one name.

The American *Mellita hexapora* has only narrow linear bands of larger tubercles (bearing the larger spines) between the branched lines radiating from the mouth on the under surface, and these lines are very much branched.

Mellita similis and *M. lobata* of Agassiz, also from the West Indies; the first appears to be only a variety, and the latter a monstrosity of this species.

The Red Sea species I have named

MELLITA ERYTHRÆA.

Shell depressed, with five ambulacra and one posterior interambulacral slit; inferior oral grooves branched, branches very slightly divided; the larger spines and tubercles in a broad band, occupying nearly the whole interambulacral space between the inferior oral grooves.

Hab. Red Sea. Sir J. Gardiner Wilkinson.

There is a new genus which has the edge of the disk perforated and the vent near the mouth, as in *Echinoglyphus*, but differs in the oral grooves being more simple and only branched near the edge, in the lanceolate form of the ambulacra, and in the square form of the tesserae of the ambulacral zones beyond the tip of the ambulacra.

Genus LEODIA.

Body depressed, with a posterior slit and five perforations between the end of the ambulacra and edge; the marginal ambulacral tesserae squarish, like the interambulacral ones; ambulacra lanceolate, acute at the tip, the anterior one most narrow and longest; pores united by a groove; ovarian plate pentangular; ovarian pores three; oral grooves simple, slightly impressed, converging towards the margin in front of the ambulacral perforations; vent near the mouth, in front of the anal perforation, with a group of three or four larger spines between it and the mouth.

1. LEODIA RICHARDSONII.

Body suborbicular, slightly depressed, five-lobed, hinder edge transverse; ambulacra lanceolate, not reaching to the discal perforations;

discal perforations ovate, small, the anterior smaller, the hinder largest, with two pairs of rather large tesseræ between the ends of the ambulacra and the foramen, the upper pair subtrigonal; oral grooves simply forked near the edge.

Hab. West Indies.

The single specimen I have seen of this species was presented by Sir John Richardson. It is rather deformed and sinuous on the right side, the hinder lateral perforation being nearly obliterated on that side.

In *Echinoglyphus* the tesseræ of the ambulacral bands are broad and band-like between the ambulacra and the ambulacral slits.

Genus ECHINOGLYPHUS, Van Phelsum. The ENCOPE of Agassiz.

The large Brazilian species of this genus appear to be very variable. The young specimens have large notches on the edge of the shell, and as the animal increases in size, the marginal edges of these notches more or less approximate together, and sometimes even become united, so as to transform the notch into a perforation. M. Agassiz on these variations has formed several species; but the Museum series, from the Brazils and other parts of the east coast of Tropical America, show that they are all mere variations of the species which Van Phelsum called *Echinoglyphus frondosus*, and Lamarck *Scutella emarginata*. I am induced to believe that *Scutella quinqueloba* of Eschscholtz, *Encope Valenciennesii*, *Encope subclausa*, *Encope oblonga*, and *Encope Michelini*, are only varieties of this species: they are all remarkable for the large size and longly-rayed star-like form of the madreporeiform plate.

Genus FIBULARIA.

The following species is peculiar as having an oblong, longitudinal vent.

1. FIBULARIA OBLONGA.

Shell ovate, elongate, ventricose; vent oblong, longitudinal, according to the axis of the shell.

Hab. N. Australia.

Fam. 2. ECHINOLAMPIDÆ.

Genus ECHINOLAMPAS.

The species of this genus may be divided into two sections, according to the form of the ambulacra.

Echinolampas oriformis and its allies have the porous bands of the anterior and other pair of ambulacra equal; the lower side of the shell flat; the mouth oblong, transverse, with (5) tubercles between the oral ambulacra.

The other species have the anterior porous band of the anterior pair of ambulacra shortest; under side rounded, convex; mouth oblong, transverse, large, marked with no tubercles, and only very rudimentary oral ambulacra.

1. **ECHINOLAMPAS DEPRESSUS.**

Ovate, depressed, subpentangular; back regularly convex.

Hab. —?

Genus **MORTONIA.**

Shell ovate, thin, rather produced in front, rounded behind, covered with small tubercles; vertex central, convex; internal cavity quite simple; ambulacra petaloid, narrow, open at the end; bands rather diverging; pores rather crowded, united by an oblong groove; beneath concave, especially near the mouth and vent; mouth rather large, roundish oblong, transverse, without any ambulacral star; vent large, transverse, oblong, in the middle of the space between the mouth and hinder edge; ovarian pores four; madreporiform plate small, central.

? *Echinocyamus*, sp., *Desmoulin.*

Mortonia, *Gray, Cat. Echinoids in Brit. Mus.*

This genus differs from *Echinocyanus* in the thinness of the shell, and especially in the ambulacra being larger, more perfect, and in the pores of the ambulacra being united in pairs by a cross groove. It differs from the fossil genus *Pygaulus* in the vent being inferior, intermediate between the mouth and edge, and transverse.

This genus is named after Dr. Morton, the historian of Northamptonshire, who first attempted to arrange the fossil *Echini* into generic groups.

MORTONIA AUSTRALIS.

Elliptical, depressed, rather acute in front, rounded behind, under side concave near the mouth and vent; vent large, oblong, transverse, in the centre between the mouth and hinder margin.

Fibularia australis, *Desm. Tab. Syn.* 240.

Echinocyamus australis, *Agassiz et Desor*, *l. c.* 140.

Hab. South Sea. Mallet.

February 11, 1851.

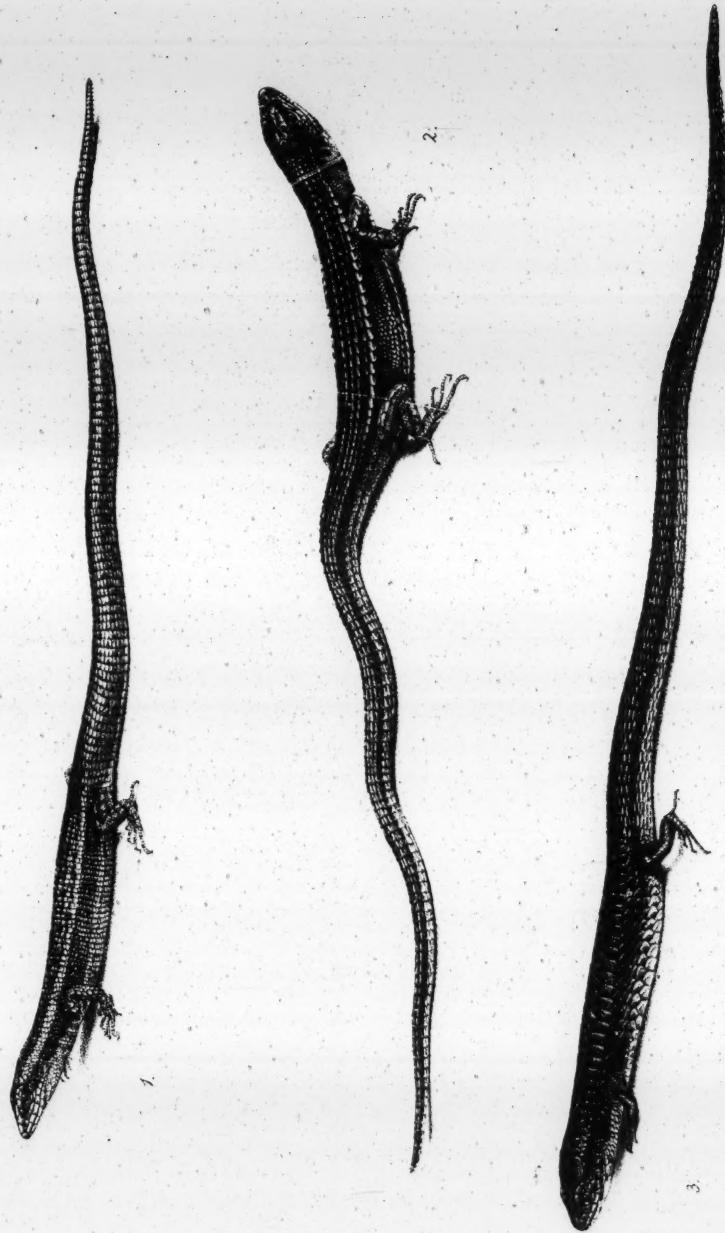
William Yarrell, Esq., Vice-President, in the Chair.

The following papers were read:—

1. **DESCRIPTION OF A NEW GENUS AND FAMILY OF CYCLOSAURIAN LIZARDS, FROM PARA.** By J. E. GRAY, Esq., F.R.S., P.B.S.

(*Reptilia*, Pl. VI.)

This interesting Lizard has lately been purchased by the Museum, from a collection of Saurians recently made by Messrs. Wallace and Bates, during their excursion within a circuit of about 300 miles of Para.



1. *ANADIA OCCELLATA*. 2. *EMMINIA OLIVACEA*. 3. *IPHISA ELEGANS*.



J. Wolf, lith.

M. & N. Han

SAUROPHAGUS DERBIANUS Kuhl

Proc Z. S. Aves XII



M & N Hanhart Imp^t

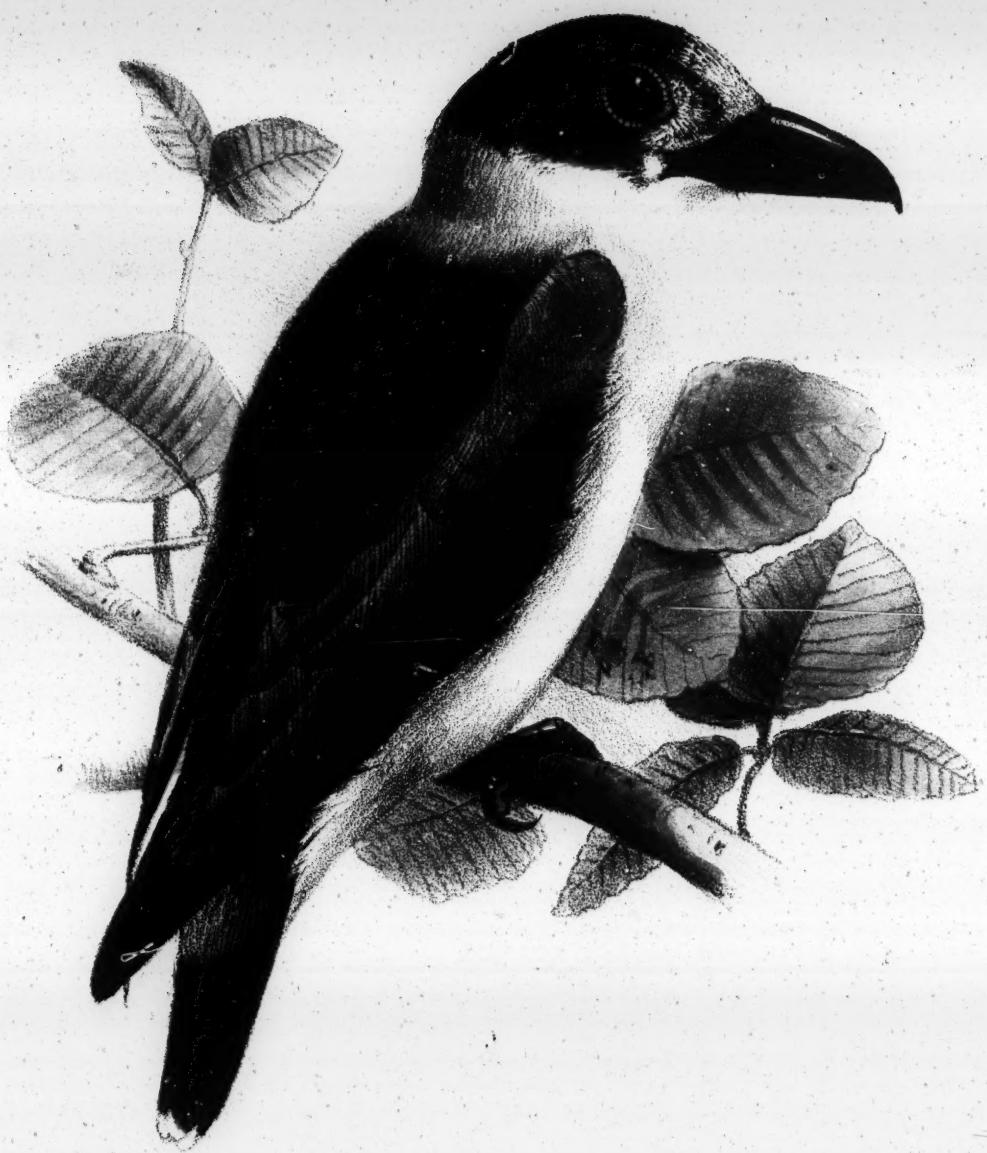


J. W. B. 1866

M. & N. Hanhart, Jr.

PSARIS FRASERI Kaup 3





J. Wolf lith.

M. & N. Hanhart Imp^t

PSARIS FRASERII Karp. ♀

It is exceedingly interesting as presenting an entirely new form, different in many particulars from any before observed; so much so, that I am induced to form for it a new family, to be placed near *Anadiadæ* and *Cherviolidæ*, which may be thus characterized:—

1. **IPHISADÆ.**

Scales of the back, belly, nape and throat smooth, broad, six-sided, transverse, forming a single series on each side of the tail, narrow, lanceolate, elongate, regularly keeled, in rings alternating with each other; head shielded; chin shielded; ear open, circular; femoral pores distinct.

IPHISA.

Head depressed, shielded; anterior frontal single, broad, four-sided; posterior frontals two, small, subtrigonal; vertebral single, rather elongate; posterior vertebral two, small, five-sided; occipital three, larger, middle one narrow, longitudinal; supraciliary shield 3-3, hinder smaller, anterior smallest; temple with small shields; labial shields moderate; rostral and mental broad; chin entirely shielded; anterior single, transverse, first pair very large, triangular, covering nearly the whole of the chin, second pair small, at the outer hinder angle of the former; nostrils lateral, in the lower edge of the nasal shield, between it and the labial shield; eyes large, lateral; eyelids scaly?; ears circular, open; nape, back, throat and belly covered with two series of broad, smooth scales; sides rounded, covered with three or four series of six-sided, smooth scales, placed in oblique series; chest with a collar of five scales, the central one elongate, triangular, the lateral ones four-sided, the outer pair very narrow; preanal shields three, the central one elongate, narrow, subtriangular; limbs short, weak, covered with broad smooth shields above, the hinder shield beneath; femoral pores 10-10, distinct, the series nearly united in front of the preanal plates; toes 5-5, unequal, the inner very short, the outer hinder separated from the other by a space like a thumb; tail elongate, cylindrical, tapering, covered above and below with whorls of narrow, elongate, regular, lanceolate, strongly keeled pointed scales, those of each series alternating with those that succeed and follow it.

1. **IPHISA ELEGANS.** (Reptilia, Pl. VI. fig. 3.)

Olive-brown black marbled; sides darker, white varied; chin and beneath yellowish white.

Hab. Para.

2. **DESCRIPTIONS OF SOME NEW BIRDS IN THE MUSEUM
OF THE EARL OF DERBY. BY DR. KAUP.**

(Aves, Pl. XXXVI. XXXVII. XXXVIII.)

During my visit to London last year I had the honour to receive an invitation from the Earl of Derby, to visit his collection at Knowsley Hall, with permission to use the materials I might find there for

the monography of *Muscicapidae* on which I was engaged. Of that collection I had already formed very high expectations; but I was agreeably surprised by finding them all surpassed, so great is the richness of this noble collection. It contains more than 14,000 specimens of stuffed birds, besides skins, which are not yet numbered. What adds still greater interest to this collection is, that it contains a large number of the original specimens described by Latham and other English authors, of whose writings these specimens are the only explanation. To the pleasure of working in so rich a collection must be added the command of a colossal library, to which not one work of importance is wanting. All this, with the aviaries of magnificent living birds, from every zone of the world, must have the greatest charm for the naturalist, and make Knowsley Hall for him a perfect Eden, which once seen shall never be forgotten.

The new birds described here include only one portion of my researches, because I could not finish so many genera. The materials of the very rich family of *Muscicapidae* are too extensive, for a complete elucidation during the limited period of my visit from a foreign country; I wish my descriptions therefore to be considered only as fragments.

The object of my visit to England was to collect materials for a complete monography of the *Muscicapidae*; but notwithstanding the many favours I received, and the extreme liberality with which my labours were facilitated in every English collection, I must confess with sorrow that I shall never be able to make a complete whole (perfectly free from objection), with materials collected in different museums. A perfect arrangement can only be achieved by the study of the materials present together, so that at every moment a comparison may be made between any two or any number of the species.

Were it my good fortune to assemble the whole materials of one family in my rooms at Darmstadt, one winter only would be necessary to finish each family in such a manner as to satisfy the requirements of modern science.

Were any one museum willing to accord me the whole materials in its possession, it is probable that all the supplementary species not contained in that collection would be readily furnished by other museums, as the absence of a few species for a short period would be of little or no importance.

That we can only climb to the summit of our science by means of well-made monographies, there can be no possible doubt; and I attach a higher value to a monography constructed on philosophical principles, than to the best fauna of any single part of the world: for only by a strict comparison of the birds of the five parts of the globe can we know what is a family, a subfamily, genus, species and subspecies. Only in this way—a difficult way no doubt—can we learn the true harmony of nature; and thus shall we be filled with admiration, when we see that every species, genus, family or order represents a certain type, and must receive its place in a scheme of classification according to fixed laws, which man must discover, but over which he has no control.

This charm can never belong to merely descriptive ornithology, because even the best descriptions are only like mosaic stones, which, when placed without rules, or arranged according to false principles, give us only a scattered mass of heterogeneous materials, or a picture destitute of truth.

These claims I have urged over and over again in my dissertations, but hitherto without effect. When shall the time arrive when a catholic spirit shall guide the destinies of science, and lead onward to that triumph of true knowledge, in which every director of a museum, and every student of the works of nature, may take his part?

At present it is impossible that a naturalist can without help arrange the whole materials of one class in his museum. Our museums are little more than great exhibitions for the people, who look too often only to colour, instead of being stores of nature's treasures, ready to be communicated to every naturalist who has proved himself worthy of the name. Every museum ought to accord freely and liberally the wished-for materials, for this is the cheapest way in which a family can be properly named and accurately classed. The common excuse that the lent materials might come to harm, is little more than an excuse. Time and destructive insects will do the harm, without the slightest advantage to science.

NISUS (seu ACCIPITER) CHIONOGASTER, Kaup.

Diagnosis.—Above dark blue grey, beneath pure white.

Description.—The male is less than the *Nisus fringillarius*. Above dark blue grey, the crown, lorum, and a stripe over the eye- and ear-cover feathers more approaching to black; ear-covering, cheek and crop with fine black quill lines; tail with three black bands and a broader band at the end, which is white bordered; the underside of the tail has the bands more silver-grey; the first tail-feather with five bands before the large end-band; the wings on the inner side with four bands before the large end-band. Before the emarginations the bands are grey, and after them whiter.

The larger female with a white eye-stripe, and broader black quill stripe on the crop; the cover feathers of the tibia with a fine rufous tint.

According to the ticket of M. de Lattre, the iris of the female is orange, and that of the male dark brown, like burnt sienna.

These two specimens were procured by M. de Lattre in Coban, in the year 1843.

Dimensions in millimetres.—

	♂	♀
Head	40	45
Gape	16	19
Wings	173	206
Tail	140	160
Tibia	47	56
Middle toe without nail	32	37

We possess several species in the genus *Nisus*, Cuv., seu *Accipiter* of the English authors. Most of these are very near to the common Sparrow-Hawk; and I think some of them, like the North American

fuscus seu *velox*, the African *rufiventris*, the *madagascariensis*, and perhaps the *erythrocnemius* of G. Gray, are not true species, but that they are subspecies of the common European *Nisus fringillarius*, forming a group amongst themselves, and exhibiting by no means the decided differences apparent between *fringillarius* and *pileatus*, or *pileatus* and *tachiro*.

In the same near relation to the *chiquera* of Western Africa do I consider the true *chiquera*, Vail. 30, from India; and this opinion I found on the following characteristics.

The West African *chiquera* has the body above darker cinereous, with very distinct narrow black lines, and the stripe beneath the eye, and the black stripe over the eye and ear-covers, are more distinct; the rufous head with darker fine stripes.

The Indian *chiquera* has the head without stripes; the body above lighter grey, with very few traces of black bands; and the black semi-circle round the eye is shorter and not so complete.

But these slight differences will not justify us in considering the West African *chiquera* as a true species distinct from the Indian true *chiquera*; it is only a subspecies of the latter true species. As such we must make a distinction, and as such it must be accorded a place in the system. I think the best way is to give a description of the oldest known subspecies, and arrange all the other subspecies with different names, distinguished by the letters of the alphabet, *a*, *b*, *c*, &c., amongst the true species. In this way it would only be necessary to give a very short description of the subspecies, consisting of the few marks by which it differs from the old known subspecies. Until we have discovered all the species contained in one and the same subgenus, we can never say with certainty whether a given specimen represents a true species, or only a subspecies; I must therefore confess that in the following descriptions of the family *Muscicapidae*, it is very probable that I have described as species some specimens which hereafter will be arranged as subspecies, when the whole species composing the subgenus are completely known.

One of the most interesting birds in the collection of Lord Derby is a little Falcon, belonging to the subfamily *Falconinæ*, which enabled me to correct the characters of the genus *Harpagus*.

The characters must be changed as follows:—Bill large, with two teeth, slender and indistinct, or strong and distinct; wings short, and in the proportions of the quills very like *Nisus* seu *Accipiter*; toes short, and the inner and outer toes of the same length.

The genus *Harpagus* must be divided into two subgenera.

The older subgenus *Harpagus* must be distinguished by the following characters:—Two strong and distinct teeth; the nostrils placed near the end of a soft membrane covering a large cavity; tibia with scales not divided.

Two species, *diodon* and *bidentatus*.

The other subgenus, in which this new species must be placed, must be characterized:—Two slender indistinct teeth; the nostrils round, very small, and bored in the nasal bones; the first wing-

feathers with very distinct emarginations, the fourth the longest; tibia with whole and divided scales (fig. 3).

I give this subgenus the name of *Spizapteryx*, and the species I have named

HARPAGUS CIRCUMCINCTUS.

Diag.—Size of the Kestrel, with white stripe over the eye, which encircles the whole head and is connected with a white collar; the tail-covers, above and beneath, white.

Descr.—Rufous ash-grey, beneath lighter, with dark brown shaft-stripes; the white stripe over the eye, and the collar black marginated; tibia-covers white; the arm and hand wings white at the roots, and like the stronger cover-feathers, with white spots and bands on the inner and outer webs; the first wing-feather without spots on the exterior web, and with fine white spots on the interior web; tail black-brown; beneath with white roots and three small white bands and an end band; the fifth without spots on the exterior web; the fourth with only traces; the third exhibits round white spots; and the two exterior feathers are white-banded. From this very irregular distribution of spots, the tail, seen from above, exhibits a very irregular drawing. Cere, naked eye region and feet yellow; nails dark brown.

I apprehend that this specimen, the only one in England, is not a very old bird. Lord Derby received this bird from Chili, by Mr. Bridges.

Dimen.—Head, 49; bill, from the cere, 16; from the gape, 22; height, 13; breadth, 20; over wing, 123; tip of the wing, 56; middle tail-feather, 148; outer tail-feather, 115; tarsus, 45; middle-toe, 26; nail, 11; outer-toe, 17 $\frac{1}{2}$; nail, 10; inner-toe, 16; nail, 12; after-toe, 13; nail, 13.

A new species of the subgenus SAUROPHAGUS, Swains.

In the little subgenus *Saurophagus*, Swains., we had, till now, only three species. These are, *lictor*, *sulphuratus*, and *flavus*. I received by Mr. Wollweber from Zacatecas in Mexico an only specimen of a fourth species; but I found in the collection of Lord Derby, and in the British Museum, a great number of the same species.

To this species I have given the name of *Derbyanus*, as a mark of my respect for that distinguished patron of ornithological science, the Earl of Derby, President of the Zoological Society.

All the species of this little subgenus have the same general colouring, and are distinguished only by very few characters taken from the colouring of the wings and from the dimensions. The young ones have, like the young birds of *Scaphorhynchus*, the bill shorter and bigger, and the head is black, without the beautiful crest of the old birds. The old birds have a white front, connected with a white band over the eyes and over the black ear-covers, and surrounding the black head, which in the middle is ornamented with a yellow crest; the chin and underpart of the neck white; breast, belly,

under-wings and tail-covers yellow; back olive-coloured; wings and tail brown, with red margins.

SAUROPHAGUS LICTOR, Gray & Mitch. Genera of Birds, t. 62.

Lanius lictor, Licht.—*Saurophagus pusillus*, Swains.—*Swainsonii*, Gould.

Diag.—Only the margins of the outer webs of the wings rufous; wings 86 mm. long. It shows the finest bill, a more graduated tail, and the smallest dimensions.

Hab. Brazil, Para.

SAUROPHAGUS SULPHURATUS.

Lanius, Gmel.—*Tyrannus*, Vieill. Enl. 296.

Diag.—Only the margins of the outer webs of the wings rufous; wings 110-114 mm. long.

Hab. Amer. meridional.

SAUROPHAGUS FLAVUS, Gray.

Corvus, Gmel.

Diag.—Only the margins of the outer webs of the wings rufous; wings 126-130 mm. long.

Hab. Brazil meridional. Bolivia.

SAUROPHAGUS DERBIANUS, Kaup. (Aves, Pl. XXXVI.)

Diag.—The wing-feathers from the second to the sixteenth have the whole outer webs on the greatest part of the length rufous; wings 128 mm. long.

Hab. Zacatecas, in Mexico.

Comparison of the dimensions.—

	<i>Sauv. lictor.</i>	<i>Saur. sulphuratus.</i>	<i>Saur. flavus.</i>	<i>Saur. Der- byanus.</i>
Head	41	53-58	60-62	60
Bill, from the forehead	22	29-30	35	32
— from the gape	26	32-36	40-42	38
Wings	86	110-114	130	128
Tail	74	82-86	100	92
Tarsus	16	25-27	28	29
Middle-toe with the nail	—	21	30	26

In these dimensions *Saurophagus Derbianus* is very near to *Saur. flavus*.

In what relation with the subgenus *Scaphorhynchus*, Pr. Max., this little subgenus *Saurophagus* is to be placed, I shall determine in my next monography, *Muscicapidae*.

Of the subgenus *Scaphorhynchus*, Ch. Bonaparte, in his very useful Conspectus, has given five species:—*pitangua*, *flaviceps*, *atriceps*, *audax*, and *chryscephalus*.

The species *flaviceps* and *atriceps* must go down, because *flaviceps*, Sw., is a female, and *atriceps* a young bird of *pitangua*; *audax* does

not belong to this subgenus, and is to be placed in the neighbourhood of *rufinus*, Spix, and *circumcinctus*, Sw., which have the same bill and similar covering.

We have only two species, *pitangua* and *chrysocephalus*, Tchudi, in the section of *Scaphorhynchus*.

Scaphorhynchus, with its broad bill, shorter and feebler tarsi and toes, represents more the Swallow type, and must be placed in the second rank of his genus.

Before I finish I may allow myself the observation, that, till now, the whole family of *Muscicapidae* has been in a condition of the greatest confusion, and that the greatest number of genera must go down, or must be considered as subgenera of some larger genera. As an example of the way in which this is to be effected, I give for instance the genus *Psaris*, into which I transplant three genera of the new authors.

Some remarks on the genus PSARIS, Cuv.

The genus *Psaris*, which is synonymous with *Tityra*, Vieill., is a true genus, which cannot be considered as the only type of a subfamily, and which cannot be divided into several genera. It is an indivisible genus, which I have separated into some little subgenera only. I prefer, from well-known reasons, the name *Psaris*.

The characters of this genus are:—Thick, strong, slightly compressed bill, without strong bristle-feathers on the mouth gape; tarsi moderately high, with broad scales on the front; on the sides and behind with small scales. *The old males have the second hand wing-feather abnormally short and of an unusual formation.* The females and young birds have the wings regular.

The species of this large genus are limited to the southern parts of America.

a. Subgenus CHLOROPSARIS.

They have the bill and the feathered lorum of the *Pachyrhamphus*, but the wings are shorter and the tail more graduated. Size of a Sparrow, colouring more variegated and greenish on the back.

1. **PSARIS CUVIERI**, Swains. Spix, tab. 45. 2.
2. **PS. ATRICAPILLUS.** *Muscicapa*, Gmel. Enl. C. 871 ♂. 831 ♀.
3. **PS. VERSICOLOR.** *Vireo*, Hartlaub.

b. Subgenus PACHYRHAMPHUS, G. Gray.

The bill unicolor black, shorter than the head, not compressed on the sides; the bristle-feathers moderately long; the abnormal hand-feather like *Chloropsaris*, with broader inner webs and emarginated only on the tip; tail unicolor, very little graduated. Size of a *Lanius colurio*. The colouring is dark and not so variegated.

We can give by the diagnosis the colouring of the abnormal hand-feather of the males.

4. Ps. VALIDUS. *Lanius validus*, Licht.

The second hand wing-feather with a long white spot on the inner web, which reaches to the third part of its length.

5. Ps. NIGRESCENS. *Pach. nigrescens*, Cab.

The second hand wing-feather black, with white margin on the exterior web.

6. Ps. PECTORALIS. *Pach. pectoralis*, Swains.

The second hand wing-feather black, with white spot near the root, and fine white exterior margin.

7. Ps. AGLAIÆ. *Pach. Aglaiæ*, Lafr.

The second hand wing-feather with an oval white spot near the root, and without white exterior margin.

c. Subgenus PSARIS.

The red and black bill on the anterior part more compressed, and like *Cassicus*, with broad root, surrounded by the frontal feathers ; lorum and eye region naked ; the bristle-feathers over the gape very indistinct ; the second hand wing-feather extremely narrow, formed like a sword, without an emargination on the tip. The colouring is silver-grey, like *Lanius excubitor*, with more or less black head, face, wings and tail. Size of *Lanius excubitor*.

8. Ps. CAYANUS, Cuv.

The black colour covers the whole head, and extends to the tip of the ear-feathers ; the bill two-thirds red-coloured ; tail black, on the root only white or silver-grey ; the wings 116-122, and the enormous second hand-feather 40 mm. long.

9. Ps. BRASILIENSIS, Swains.

The black of the ear-feathers extends further than the black of the head ; the bill one-third red-coloured ; the inner webs of the wings white-bordered ; the wings 129, and the enormous second hand-feather 41 mm. long.

This species is probably a subspecies of *cayanus*.

10. Ps. SEMIFASCIATUS. *Pach. semifasciatus*, Spix, t. 442.

The black on the head covers only the front to the eye, and descends to the anterior ear-feathers round the eye to the chin ; tail black, with a silver-grey or white band under the tail-covers, and a white band on the tip ; the wings 127-134, and the enormous second hand-feather 46 mm. long ; it is on the exterior web black, and on the interior white.

The female with dirty brown head and a greyish brown back, with a tinge of red.

11. Ps. MAXIMUS, Kp.

In the collection of Lord Derby I found a young bird of very large

dimensions, which does not belong to any of the preceding species. The bill is reddish on the root; the under parts are lighter than on the young *cayanus*; the stripes are more obsolete, and are reduced on the side as black shaft-stripes; shafts of the tail reddish brown; under tail and interior wing-covers white, without spots.

	<i>Ps. cayanus.</i>	<i>Ps. maximus.</i>
Dimen.—Head	52	56
Gape	35	35
Wing	129	129
Tail	70	73
Height of the bill	11	13
Breadth	12	13 $\frac{1}{2}$

It would be very interesting to discover the old bird of this species.

d. Subgenus ERATOR.

It unites the size, colouring and formation of the second hand-feather of the true *Psaris* with the bill and feathered lorum and eye region of the other subgenera.

This little subgenus, with its mixed characters, gives the clearest proof that *Psaris*, *Pachyrhampus* and *Bathmidurus* cannot be considered as true genera.

12. Ps. INQUISITOR, Orb. *Lanius inquisitor*, Olf.

Diag.—Tail black.

Descr.—The male with black head and white ear-covers, connected with a white collar, which divides the black head from the silver-grey body; tail black, at the root white, which extends to the margins of the inner webs; end of the tail without white band; the second hand-feather on the inner web white.

The female (*Jardinii*, *erythrogenys*, *Selbyi*, and *Nattereri*, Sw.) with white front and rufous ear-covers.

13. Ps. FRASERII, Kaup. (Aves, Pl. XXXVII. XXXVIII.)

Diag.—Tail two-thirds white, with black white-bordered end.

Descr.—The head to the ear-covers black; ear-covers and under the posterior part of the eye white; the second hand wing-feather light ash-grey, with white root.

The dimensions of these two species are nearly the same:—head, 52; gape, 32; height of the bill, 10; breadth, 14–15; wing, 105–113; tail, 63–70.

I give to this very distinct species the name of a very able zoologist, who is going a second time to Western Africa. From this journey we may anticipate the greatest benefit to our science, and we wish Mr. Fraser the best success. For all his kind assistance in the collection of Lord Derby I give him my best thanks.

e. Subgenus BATHMIDURUS, Cab.

They have the bill like *Chloropsaris*, *Pachyrhampus* and *Erator*, but the tail in most of the species is more graduated. The colouring

of it is black, with white or yellow end spots. Size of a Finch. The predominating colour of the males is black, white and grey.

In this little subgenus we have different type-species, about which the different subspecies arrange themselves. One of these is

Ps. marginatus.

Head-feathers black, on the tip with steel-blue; wings black; shoulder-covers, wing-covers and arm-wings white marginated; tail graduated, black with broad white tip.

The female has all the margins and the under parts rufous yellow, the back greenish, and the head darker coloured.

a. Ps. marginatus minor.

Lorum and a small line on the front whitish; ear-covers, back part of the neck, lower part of the back light grey; upper part of the back black; all the under parts white with grey tint; the enormous second hand-feather white, on the exterior web on the root with a black spot, and from this spot till the end; along the shaft on the interior web a small long black stripe.

b. Ps. marginatus major. Bathmidurus major, Cab.

Lorum and a small line on the front whitish; before the eye a black spot of bristle-feathers; the shoulder-covers all white; over-back black; the enormous second hand-feather longer, white, with a small stripe along the shafts on both sides.

c. Ps. marginatus tristis, Kp.

Without a small white line on the front; lorum and the whole head black; the feathers on this part are more massive on the tip, and have more lustre; the shoulder-covers only on the tip white; the whole neck and upper part of the back black; lower part of the back, ear-covers and all the under parts dark grey, mixed with black; the tail has not so much white on the tip; the under side of the wings with smaller white margins; the second enormous hand wing-feather on the inner web whitish with grey spots, on the outside black, with a grey margin on two-thirds of the upper part; the emargination on the tip very distinct.

Mus. Derby.

Comparison.—	<i>Ps. marg.</i>	<i>Ps. marg.</i>	<i>Ps. marg.</i>
	<i>minor.</i>	<i>major.</i>	<i>tristis.</i>
Head	35	38	36 .. 37
From the gape to the tip of the bill	18	19	19 .. 20
Wing	65	84	73 .. 75
Tail	50	64	56 .. 62

A new species in the collection of Lord Derby and in the British Museum, forming a second type-species, I have called

Ps. parinus, Kaup.

Size of *Parus major*; head-feathers black, with a soft violet lustre, and not imitating the form of scales; lorum, ear-covers and all the

under parts dirty white; the whole back and shoulder-covers grey; the little plumage of the wings black or grey, with whitish margins; hand-wings black, arm-wings dark grey, marginated with whitish yellow; the inner webs of the wings broadly marginated with whitish yellow; tail-feathers grey, along the shafts black and on the margin narrowly bordered with yellowish white; the second enormous hand-feather with broader inner web black, with white margin from the emargination to the end, and with a large long white spot from the root to two-thirds of the feather.

The female rufous with darker head; wings black-brown, with predominating rufous yellow margins; belly and under tail-covers lighter-coloured.

This species comes from Para.

Very near to this species must be placed the *Psaris surinamus* (*Muscicapa*, Gmel.), which is characterized with the following diagnosis:—*Cauda rotundata, apice albâ; corpore nigro, subtus albo.*

I have not hitherto seen this species, nor *Ps. niger variegatus* and *melanoleucus*.

Dimensions of *Ps. parinus*:—head, 34; gape, 17; wing, 68; tail, 49.

Genus SETOPHAGA, Swains.

This genus is one of the finest of the whole family of *Muscicapidae*. It is found only in America. Only one species inhabits the northern part, namely the very distinct species, *Set. ruticilla*, with its yellow or red-banded wings and tail. The tail-feathers are pointed.

The greater part inhabit the southern parts. They form various little subgenera, distinguished by their very different colouring. One of these, and I think the most beautiful, is the little section to which the following species belong. They have much yellow on the head and under side; on the over parts dark cinereous.

SETOPHAGA RUFICORONATA, Kp.

Diag.—With red head-spot; the first tail-feather all white.

Descr.—The hind ear-feathers black; front, lorum and eye-region yellow; the first tail-feather all white; the second white, with black spot on the outer web, and black margin on the inner web; under tail-covers black-spotted.

Mus. Derbyanum.

Very near to this species is

SET. RUFICAPILLA, Cab.

of which Bonaparte gives the diagnosis in the following manner:—*Fusco-plumbea, subtus omnino flava, lateribus fuscis; pileo castaneo, rectricibus extimis apice albis.* Guiana.

SET. LEUCOMPHOMMA, Kp.

Diag.—Lorum, eye-region and chin white.

Descr.—Ear-covers black, the yellow colour reaching only to the after part of the eye; tail and under tail-covers like *ruficoronata*.

Hab. Bogota. Mus. Derb.

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SET. ORNATA, Boss.*Diag.*—The whole head beautiful yellow.*Deser.*—The head-feathers longer (10 mm.); the face and chin white; the anterior ear-feathers on the tip black, the hind ear-feathers all white; the first tail-feather all white, the second only on the basal inner web black; under tail-covers black-spotted.*Hab.* Andes. Mus. Derb.**SET. FLAVEOLA, Lafr.***Diag.*—The hind ear-feathers with black stripes.*Deser.*—The face orange; the anterior ear-feathers black, the hind ear-feathers yellow, black-striped; under tail-covers white; the first to the third tail-feather with white shaft and shaft-spot, which is enlarged on the tip.*Hab.* Columbia. Mus. Derb.A third type-species is **VULNERATA, Wagl.**

The species belonging to this type-species have the breast and belly beautiful red.

They are natives of Mexico.

SET. VULNERATA, Wagl.

Above cinereous, with black front, throat and rufous spot on the head; first to third tail-feather with white spots on the tip.

SET. PICTA, Swains. Zool. Ill. t. 3. *tricolor*, Licht.

Above, throat and sides of the lower parts black; margins of the first hand-wing and the three least arm-wings white, like the cover-feathers of the wings; the first and second tail-feather nearly all white, the third white, with broad black margin on the inner web.

SET. MULTICOLOR, Bonap.

Black; front, small band over the wing-covers, belly and the tips of the tail-feathers white.

A fourth type-species is

SET. VERTICALIS, Lafr.

Cinereous, head rufous; breast and belly yellow; the first tail-feather three-fourths, the second half, and the third only on the tip white.

Hab. Bogota. Mus. Derb.**SET. FLAMMEA, Kp.**

Breast and belly orange; the first to the third tail-feathers only on the tips white.

Hab. Guatimala. Mus. Derb.**SET. MELANOCEPHALA, Tehudi, p. 192. t. 12. 1.**

A small line of the front, lorum, eye-region, like all the lower parts, yellow; the four exterior tail-feathers white.

Hab. Peru. Mus. Derb.

Genus *TYRANNULA*, Swains.

The genus *Tyrannula*, as Prince Ch. Bonaparte has apprehended it, is too large, and the forty species must be divided into some natural genera and different subgenera.

The manner of arranging these species in geographical sections is very simple, but very often the wrongest way, although so very clear that it can be understood by everybody. It is true that some genera are limited to a certain part of the world; but there are also many genera which are composed of species from all parts of the world, or from different zones of the same part of the earth.

A very natural section is formed by the species which Bonaparte called "Ultimi Tyrannorum sive Tyrannularum primæ."

The bill of the length of the head; over the nostrils as high as broad; the back rounded off; the gape bristle-feathers of moderate length; the wings moderately long, reaching to the tail-cover feathers; the tip of the wing short; the first wing-feather as long as the eighth, third and fourth the longest; the long tail of the length of the body; the head unicolor, without yellow crest, but the feathers can be erected; above dirty olive, with darker-coloured head; gorge and over breast ash-grey; the belly yellowish; the margins of the wings and tail rufous.

1. *TYR. COOPERI*. *Muscicapa*, Nuttall.

With shorter wings than *mexicanus*, but with longer bill, like *cri-nita*; throat and over breast light grey, not so dark as *cri-nita*; the black stripe along the inner webs of the tail-feathers is broader, like *stolida*.

Hab. Northern America and Chili. Brit. Mus.

2. *TYR. CRINITA*. *Muscicapa*, Linn. ; *irritabilis*, Vieill.

With longer wings; throat and over breast darker grey; all the wing-feathers, except the first, black-brown with rufous margins.

Hab. North America. In every museum.

3. *TYR. GOSSII*, Bonap.

With longer wings; the anterior part of the outer webs of the first and second hand-wing whole rufous; the head darker, and the ash-grey dark, like *cri-nita*.

Hab. Jamaica. Brit. Mus.

4. *TYR. MEXICANA*, Kaup.

With short wings; all the wing-feathers, except the first, with rufous margins; breast light ash-grey; above lighter.

Mr. Wollweber sent me this species, which I found also in the British Museum.

5. *TYR. STOLIDA*. *Myobius*, Gosse.

With short wings; the rufous margins on the wing-feathers very fine; the black stripe along the shafts of the inner webs of the tail-

feathers reaching only to the middle of the feathers; the inner webs of the exterior tail-feathers with extinguished bands.

Hab. Jamaica. Brit. Mus.

Comparison of the dimensions.—

	<i>Tyr. Cooperi.</i>	<i>Tyr. crinita.</i>	<i>Tyr. Gossii.</i>	<i>Tyr. mexicana.</i>	<i>Tyr. stolida.</i>
Head	46	45	48	43	43
Bill from the gape	28	28	31	24	24
Wing	94	100-105	104	93	86
Tail	88	89-94	95	86-90	82
Tarsus	22	19	24	22	19

It is possible that all these species are subspecies of one or two type-species. This point, however, can only be determined by future researches.

Genus TODIRHAMPHUS.

I found in the collection of Lord Derby two new species belonging to this genus.

TOD. PECTORALIS.

Green, with a white spot before the eye; throat and chin dark ash-grey; next this with white on the crop; breast light ash-grey; the inner margins of the wing-feathers and the inner wing-covers yellow; outer margins of the wing-feathers and tail olive; belly and sides white.

Head, 28; gape, 14; wing, 45; tail, 42; tarsus, 15 mm. long.

Hab. ? Mexico.

TOD. RUFICEPS.

With red head and dark ash-grey occipital feathers; next this an ash-grey collar; over part of the wings black, with two light yellow bands; wing- and tail-feathers with olive margins, which on the arm-wings are more white; lorum black; ear-covers brownish; chin and throat white, with brownish tint, and divided from the yellow under parts with a black striped band; the tibial feathers black.

Head, 26; gape, 13; wing, 46; tail, 36; tarsus, 17 mm. long.

Hab. ? Mexico.

PHRYNORHAMPHUS, Kaup. *Smithornis*, Ch. Bonap.

The bill very broad, half as high as broad, with sharp culmen; the wings short; the first wing-feather long, nearly as long as the seventh, the second as long as the third and fourth; outer toe at the base connected with the middle toe.

I am strongly inclined to believe that this section does not possess the song-muscles.

PHRYNORHAMPHUS CAPENSIS. *Platyrhynchus capensis*, A. Sm.

Descr.—Upper mandible black, lower mandible yellow; front and lorum rufous yellow; head black; the bristle-feathers with white

roots ; ear-covers ash-grey, with whitish shafts and shaft-spots ; back olive-grey, with black spots ; the roots of all the feathers on the back pure white ; wing-covers with rufous yellow margins, which form two small bands ; lower parts white, on the sides tinted with brownish rufous, and with broad black shaft-spots ; the middle of the throat, belly and under tail-covers white ; tail black-brown, with olive margins.

Head, 40 ; gape, 22 ; height of the bill, 7 ; breadth, 12 ; wing, 72 ; tail, 55 ; tarsus, 18 ; middle toe, 15 mm. long.

Lord Derby's collection. Brit. Mus.

A communication was received from Dr. G. R. Bonyan, of British Guiana, on the Raptorial Birds of that country, of which the following is an abstract :—

3. NOTES ON THE RAPTORIAL BIRDS OF BRITISH GUIANA.
BY DR. G. R. BONYAN.

There are, I believe, only three species of Vulture in British Guiana. The first is the well-known

KING OF THE VULTURES.

Sarcorhamphus Papa of Dumeril.—*Irubicha*, Azara.—*Vultur Papa*, Linn.—*Le Roi des Vautours*, Cuv.—*Carrión Crow Governor* of negroes.

There is a very good drawing of this bird in Latham's 'General History of Birds.' It is by no means common in Demerara, but young birds are occasionally brought from the upper rivers, particularly the upper parts of the Mahaica and Mahaicony creeks, where they abound, to the town. They are easily tamed and eat any sort of meat, not showing a particular predilection to putrid meat. Although I have seen this bird in its wild state, I have never witnessed it alighting upon a carcase ; the common Carrion Crows, it is said, cede place until the king has fed. Mr. Waterton witnessed this singular fact, and I have heard it corroborated by more than one person of veracity. I know nothing of its habits or nidification. The colours about the head and neck are remarkably beautiful and varied, and have a downy bloom as it were, which it is impossible to imitate by painting the preserved specimen.

The COMMON CARRION CROW. *Cathartes iota*.

If this bird be the same as "*Vultur iota*" of Charles Bonaparte, it is imperfectly described by Cuvier as having only the head naked ; whereas it has the head and the neck more than half way down, naked, warty and black ; nor is its plumage of a shining black, but dull and inky. The Carrion Crow is seen over the whole surface of the country, either soaring on dry sunny days at an immense height in the air, or swooping down in wide gyrations towards the ground. If a carcase be thrown out on a dam, no Carrion Crow being within the range of vision, after a short time one will be seen in a distant

part of the horizon ; presently another will appear ; then another and another, until they will be observed coming from all quarters ; not, however, in a direct line towards the object, but in more or less extensive gyrations. There can be no doubt that the first Carrion Crow that sees the object, by an increased energetic quickness of its flight, gives notice to those which are within its sphere of vision that there is game in view, which accounts satisfactorily enough for the vast number of these birds which are collected from every quarter of the horizon in so short a time after a dead body is exposed. Indeed, to the eye of the common observer, the difference of motion of a *Vultur iota* on the look-out, and after it has sighted its quarry, is very remarkable. The former is a slow, steady and gentle soar, in small gyrations, at an equal height ; the head of the bird, if it be examined with a glass, being seen turning from side to side. The latter is a rapid and energetic advance, every hundred yards or so the speed being increased by several vigorous flaps of the wings. It appears to me to be quite unnecessary to enter into the discussion, as to whether this bird hunts by sight or scent, as it is quite sufficiently established that it is assisted by both senses. The instant a snake is killed, the Carrion Crow will, if in the neighbourhood, sight the object, and speedily descend and commence his attacks upon the dead animal. Or if a negro lets fall a calabash with eggs, and they are broken, the Carrion Crow will soon be seen feasting on the unwonted luxury. If, on the other hand, a body be imperfectly interred, this bird will, so soon as putrefaction has commenced, be seen in the neighbourhood perched upon a tree or tombstone, and apparently much puzzled to know where the piece of mortality can lie concealed which evolves the, to him, delicious fragrance. If the body be that of a tough-skinned animal, such as an ox or horse, the Crows will wait, perched on trees in the neighbourhood, until putrefaction has softened it sufficiently for them to feed on it. Their bills and feet are remarkably weak. They build in very high trees nests of broken sticks. The eggs when broken have a semi-putrid odour. It is worthy of remark that the Carrion Crow is common about the streets of New Amsterdam, scarcely getting out of the way of the passengers ; while in Georgetown, not more than sixty miles distance, this bird is never seen in the streets. The former town is said to be much more cleanly and well-kept than the latter.

The YELLOW-NECKED CARRION CROW.

This bird is smaller and more slender than the common Carrion Crow. It is found principally about the creeks of Mahaica and Mahaicony. It is less numerous than the Black-headed Carrion Crow. It is not either so gregarious a feeder, and appears to search for smaller carcasses, such as the putrid fish on the dried savannahs bordering the creeks. There is certainly, with the exception of the colour of the head and neck, the absence of warts, and the slender form of the body, but a very slight specific difference between this bird and the former. The colour is black, with blue and greenish iridescence.

The FISHING-HAWK. *Pandion.*

A very handsome little fishing Eagle. I do not think this is the same species as *Le Balbusard* of Cuvier. It enlivens very much the scene about the flat swampy lands of the sea-coast, when the trenches are full with the mixed tide and bush water. It hovers for a length of time in one spot at a considerable height, and then suddenly descends vertically on its finny prey, or it alters its position to another part of the trench. When it makes a capture it flies off to a neighbouring tree to devour it.

The LARGE BLUE HAWK OF THE CATARACTS.

This bird I shot with a single bullet while descending the long and swift rapid of Twansinki, lat. 5° , on the Essequibo. It is very rarely seen on the lower parts of the rivers. The manner of its death was as follows, as I find on referring to my journal of the trip:—10th November. An exciting day's journey in the descent of the rapids between Twansinki and Waraputa. Some of these we did not venture to *shoot*, as it is called, but had to let the boat down, by means of the tow-line, most ignominiously, stern foremost. We had, however, the satisfaction of being very nearly swamped in descending a long rapid in the lower Twansinki range, which made up somewhat for the slight we considered had been put upon our courage by our coxswain, Hermanus, refusing to shoot down those rapids he considered to be dangerous. Our indignation against the noble captain was considerably cooled. The great danger in the descent of these long rapids is from the boat being carried down by the rush of the torrent, and the bow being at the same time more or less submerged by the curling back of the water, when it meets the resistance of the rocks in its passage. Thus the descent, although very swift, is in a succession of violent plunges, at each of which the boat, if not built with a sufficient *spring* in the bow, which was unfortunately the case with us, takes in a large quantity of water, and is in great danger of being swamped before it reaches the foot of the rapid. Everything depends of course on the *way* the boat has on it, and our crew, on this occasion, urged by the frantic gestures and shouting of the steersman and bowman, pulled with amazing vigour and energy. In the very midst of the hurly-burly of this descent, a Large Blue Hawk flew rapidly across our bow and alighted on a high dry tree. My soul had long yearned after a "Blue Hawk" of the Cataracts. Before I could fairly cover it, the bird was eighty yards behind us. The report of the gun was scarcely audible in the tremendous noise, and the Hawk for a second remained immovable and apparently unhurt, when his head sunk, his body swung forward, and the powerful grasp of his talons relaxing in death, he fell plumb down.

There are three species of *Ibycter*, or "Carracarra Hawks," as they are called by the creoles. These are very numerous on the banks of the rivers and creeks, and appear to be continually on the alert, flying from tree to tree, alighting and scratching on the sands, and indeed being the only specimens of the bird kind on the higher

rivers which are always to be met with during the whole day. The first is

The LAUGHING HAWK.

A well-known bird, which has been described by Waterton, Schomburgk and others. It is remarkably noisy, and is generally seen in company with three or four others of the same species flying about and perching on the high trees on the borders of creeks, uttering almost constantly a discordant loud gabbling, from whence it has got the name of the "Laughing Hawk." This bird feeds on eggs, young birds, insects, and does not despise certain sorts of fruit. It is, in fact, omnivorous.

The YELLOW-HEADED CARRACARRA HAWK.

Smaller than the preceding. Three or four are generally seen together. They frequent chiefly in the months of September, October, and November, when the guana and river turtle lay their eggs, the extensive sand-banks on the river Essequibo, beyond the first rapids in latitude $6^{\circ} 10'$. I have seen them in companies of from three to five, assiduously scratching up the sand in which the guana or turtle had laid; and as these reptiles deposit their eggs at least eight inches beneath the surface, their rasorial powers are very considerable. The sands on this part of the Essequibo extend in every direction, lying on the beautiful bosom of the placid river, among finely wooded islands of all sizes, with most inviting sand beaches, enticing you to land at every turn. If you do land, you will probably see on the hard fine sand the scrambling track of a guana, which, if petrified, would set a palaeontologist frantic with delight. Close by, the steadier and more decided footprint of the cayman, clearly showing that he is made of somewhat sterner stuff than his herbivorous friend, and still further off, a camoude has dragged his slow length along. There are tracks of turtle, ducks, snipes, lizards, and all sorts of *Copriæ*; in fact, a first-rate piece of interesting geology, only not baked or compressed yet. Edging the bank is the eternal forest.

The RED-HEADED CARRACARRA.

This bird is of the same size as the preceding, but its habits are somewhat different, as its food appears to be principally confined to insects and small reptiles. I found the stomach of one I dissected full of fragments of beetles. Mr. Swainson places these birds at the head of the Kites, where they are certainly more naturally situated than among the Eagles, where they are placed by Cuvier.

The next birds are the Awl-beaked Fish-Hawks. I only know two, and they are very near one another.

The LARGER AWL-BEAKED FISH-HAWK

Is remarkable for the great length of the curve of the upper mandible, and is somewhat larger than the next. Both are savannah birds, feeding on freshwater fish. They are often seen in large flocks, particularly on an extensive savannah, through a part of which is dug

the freshwater canal called the "Lamaha," which was intended to supply the city of Georgetown with water. They prey particularly on the Hassar (*Callichthys*, Schomb.). This curious fish, which builds a nest in or under which it lays its eggs, is found in abundance in the small pools and water-holes of the savannahs. It is a very domestic fish. The female, when the time for spawning arrives, collects a number of small pieces of stick, and places them together, across one another; it then, descending beneath this structure, which is about a foot in diameter, expels a quantity of viscid matter, which, being mingled with air, causes the nest to float. In this viscid exspumation the eggs are laid, and both the male and female remain near the nest, making furious strokes at any intruder; and as they are provided with a very sharp bony first ray to the dorsal fin, if a wound be inflicted it is generally a severe one. The form of the beak of the Fish-Hawk is admirably adapted for separating the plates of mail in which the Hassar is enveloped. It is when the water in the pools and water-holes is reduced in the first part of the dry season to soft mud, that flocks of these birds are seen on the savannahs, feasting on Hassar.

The SMALLER AWL-BEAKED FISH-HAWK.

Habits the same as the former. From the habits of this group of birds of scouring the savannahs in search of prey, the length of their wings, and the strength of their claws, they approach near to the Harriers.

The SCISSORS-TAILED KITE. *Nauclerus furcatus*.

This is a very graceful bird, and is generally seen soaring, with widely-forked tail, above the lower parts of creeks, or over rivers when the water is fresh. They are, when perched, generally in companies of from five to six. They strike at small birds, creepers and such like, when feeding. I do not think that they strike at birds on the wing, and I never saw the *Nauclerus* pounce on a fish, although they appear to prefer to soar over the broad parts of creeks and fresh rivers. In fact, they are scarcely ever seen elsewhere. The Camouni creek, a few hours' sail up the Demerary river, is a favourite haunt of the Scissors-tail. Here they may be seen by the now rare traveller in this once thickly populated and very beautiful creek, either soaring high up in the brilliant sunshine, with a gentle undulatory motion, moving the head from side to side, and alternately opening and shutting the fork of the tail, whence their name of "Scissors-tail"; or perched in a small company upon some high creek-side tree, attracted probably by a flock of creepers or manakins. In coming down the Camouni one morning with a pleasant company of sportsmen—we had bivouacked near the source of the river the night before—I was much struck with the remarkable gracefulness and beauty of the *Nauclerus*. A company of six had selected a high tree close to the water's edge, at a wide and graceful bend. The approach of our boat alarmed them, and they flew up and around the tree as if inclined to settle again after we had passed on; but on one of our party firing, the

birds, finding the danger impending, sought for safety in the higher regions of the atmosphere, and it was in their gyrations to obtain a suitable elevation that their gracefulness and beauty were particularly remarkable. I am not acquainted with any Hawk which soars to such a height as the *Nauclerus*. I have seen them over the river Pomeroon, at an elevation so great as to be scarcely visible.

The whole of the next group, nine in number, with the exception of three, are birds which frequent the extensive abandoned fields near the sea and the courida trees (*Avicenna nitida et tomentosa*), which form a narrow belt of vegetation along the coast, between the sea and the high roads. These fields, which were for the most part formerly in cotton, are often inundated, either from imperfect drainage of bush-water, or the incursion of the sea, which, since the British people commenced to make us pay the penalty of having had slaves, is fast resuming its ancient dominion, from whence it was dammed out by our Dutch predecessors. Over these fields may be seen hunting with indefatigable industry the first two of the group; viz.

The BROWN-BACKED HARRIER, and

The LONG AND SLENDER-LEGGED BUZZARD.

They search every bush, destroying old and young alike, snatch up the little grass-finches, and in fact are a most dreadful scourge to the feathered inhabitants of these woe-begone and miserable looking swamps, remembrances of our former glory and shame. The next is

The CHESTNUT HARRIER.

A very rare bird, which was shot while flying over the Mahaica creek. Nothing whatever is known of its habits, but from its structure they must be similar to those of the two former.

The LARGE SEA-FISHING HAWK.

The coasts of Demerara, it may not be unnecessary to inform the English reader, are bound by vast mud-flats, which at high tide are covered by the sea. At dead low tide the water-mark is, at many parts of the coast, not visible. It is on the courida trees which border the coast landward that the Large Sea-fisher may be seen waiting patiently for the influx of the tide, which brings with it his food. At about half-tide he begins to bestir himself, and as there is always an abundance of fish brought up by the water, he soon captures as much mullet and other such-like coast-fish as gratifies his hunger. The Sea-fisher fishes on the hover from a considerable height, pouncing down vertically on its prey. The next is

The BIRD HAWK,

With striated chestnut belly, which does not hunt on the wing, but sights its prey, small birds, from the perch, generally a courida tree. It builds a nest of dry sticks upon these trees. The next is

The PARROT-BEAKED BUZZARD.

A rare bird, and was shot in a cocoa-nut tree in the Mahaicony. It sights its prey, small birds, from the perch. Another species,

The LONG-LEGGED SNAKE-EATER,

Leads us back to the abandoned fields. This bird, a large, brown, dirty and ruffianly-looking animal, is very often seen, particularly on the east sea-coast, undergoing the punishment peculiarly appropriated to bullies, namely, being severely thrashed by fellows much smaller than himself. The Kiskadee, a tyrant shrike, is the little champion who thrashes the Snake-eater. Sometimes two or three of these birds will be seen, always keeping above it, pecking the Hawk most unmercifully, and they seldom fail in bringing it to the ground, when the sight of its powerful talons I presume, reminding them that the better part of valour is discretion, causes them to fly off to some neighbouring tree and set up a glorious "Io Paeān" of Kiskadee, Kis-kis-kiskadee over their victory. I have seen this Hawk capture snakes more than once and fly off to its perch to devour the prey. Another species,

The CRAB-EATER,

Frequents the courida trees, from whence it sights its prey on the mud-flat, namely crabs. It pounces upon any unwary crab that quits its hole, and, unlike the Snake-eater, consumes it on the spot where it takes it, and then returns to its look-out. They build a nest of sticks in the courida bush. Another species,

The INSECT-EATER,

Is the most ignoble of all our Hawks. Its feet and claws are singularly weak, and it feeds almost exclusively on beetles and other insects, which it captures on the courida bush, which it frequents. I have opened them and taken a large quantity of the fragments of insects out of the stomach.

The CRESTED AND BOOTED EAGLE.

A live specimen of this beautiful bird was brought to me as a present by an old servant who had left me a long time, and had been living far up the Demerary river. He unfortunately knew nothing of its habits, and told me that it was the only one he had seen. I have never seen one in the wild state. This bird lived for some days, but would not eat. Apparently, the beautiful semicircular crest of black feathers with a white central star was only elevated when the bird was excited. This however was almost constantly the case, from extreme wildness. The cry was a loud, plaintive, diminishing ha-ha-ha-ha-ha. This bird certainly has most of the characters of a true Eagle. It is heavy and robust, with a beak somewhat straight at base; tarsi plumed to the toes; wings moderately long, with the fourth feather the longest; and the general air is that of an Eagle.

There are only three Falcons that I have seen here; the first two true Falcons, with the typical characters and habits marked, and the third with all the typical characters (excepting the two-toothed beak) and the habits wanting. The first two are little Falcons, namely,

The CHESTNUT-BELLIED FALCON, and

The WHITE MOTTLE-BELLIED FALCON.

They are both birds that strike their prey on the wing, and are capable of killing birds nearly as large as themselves. The yellow-bellied species may be seen very busy at dusk, hunting bats with amazing swiftness. I have never been able to find either of their nests.

The Two-TOOTHEd BARIDI.

A bird with precisely similar habits to the next three birds. Like them, the Baridi never strikes, but confines himself to pillaging nests and destroying young birds. He is a sneaking marauder and burglar, and not audacious enough to commit highway robbery and murder, like the true Falcons. His wings are very short, and the characteristic formula of the quill-feathers is wanting. Consequently, I have placed this bird at the head of the succeeding group.

The PLAID-CHESTED SHORT-WINGED HAWK.

The BROWN-BACKED SHORT-WINGED HAWK.

The YELLOW-CERED SHORT-WINGED HAWK.

They are characterized by the same habits as the Baridi, stealing eggs and murdering unfledged birds.

The two next Hawks are large and powerful. The first is a large Black Hawk. It is a very fierce and destructive bird. It will kill rats and other small quadrupeds, as the Adouri (*Cavia agouti*), &c., and will strike at and kill so large a bird as a Currycurry (*Ibis rubra*). My huntsman Benjamin tells me that some time ago he shot a Currycurry, and before the bird fell to the ground, a large Black Hawk seized it and bore it away. It is very destructive to hen-roosts. The next species is found far up the river Demerary, and is by no means common. Mr. John King, a very respectable bird-stuffer and an observant naturalist, tells me that in a period of many years, constantly occupied in procuring species of birds and animals, he has only seen a few specimens of this bird. I have ascertained from the same authority, that its habits are very similar to the Large Black Hawk of the coasts.

I only know of five Owls in this country; of four I have procured specimens. The first two, Booted Owls without ears, are common enough, and I have not been able to ascertain anything in their habits differing from the well-known and frequently described habits of their European congeners.

The SMALL-BOOTTED BROWN OWL.

This is seen frequently at dusk in company with the Little Bat-falcon, hunting bats. The larger one, or Large-booted Black and White Owl, is strictly a night bird, and found principally in the forests. The next two are likewise strictly night birds.

The LARGE LONG-LEGGED STRIX, or JUMBI BIRD,

Inhabits hollow cabbage-trees or old and dilapidated houses, unfortunately that style of habitation in Georgetown, and over the whole country, being at this time the rule, and not the exception. They make a great noise at night, a sort of clack, clack, clack, &c., terminating with a harsh, disagreeable and ominous scream. They are held here, as elsewhere, to be birds of ill omen, portending death, wherefore they are called "Jumbi," or Ghost Birds, by the negroes.

The LITTLE LONG-LEGGED STRIX

Is a very handsome little mouse-coloured Owl, which preys upon moths and other night insects as well as small bats. They are mostly seen on the savannahs and in the courida bushes, and are strictly nocturnal.

It will be perceived that I have not described the *Harpya destructor*. This is in consequence of my not having had an opportunity of examining a dead specimen; a living specimen which I have access to, in the possession of Governor Barkly, being altogether too fierce to take liberties with. It has a very owlish appearance, both in its facial disk and soft plumage. I have seen another imperfect skin of a very large Eagle feathered to the toes, with tremendous talons; both this and the Harpy I hope to be able to describe in a subsequent communication.

February 25, 1851.

R. H. Solly, Esq., F.R.S., in the Chair.

Mr. Gould directed the attention of the Meeting to two Hybrid Birds, concerning which he read the following letter, which had been addressed to Mr. B. Leadbeater, F.Z.S.

"Cottimore, Walton-on-Thames, December 17, 1850.

"SIR,—With reference to the bird which you now have of mine to preserve, I will tell you all which I have ascertained concerning it. It was shot at Henley Park, in the county of Surrey, by the keeper of H. Halsey, Esq., on a part of his property called the Peat Moor, and not far from the Frimley ridges; a wild tract of country, with a good many black-game upon it. The keeper was shooting pheasants for the supply of the house, and this bird rose on the opposite side

of the hedge to that on which he was, on the outside of a large covert : he did not see it distinctly ; but as in rising it made the sort of cry or crowing which a cock-pheasant is apt to do when disturbed, he shot it. I found it hung up in the larder, but was just in time to rescue it from the cook, and Mr. Halsey allowed me to take possession of it to be preserved. There is no doubt of its being a hybrid between the black-cock and hen-pheasant, as it appears that a black-cock has for the last two years frequented this particular covert and fed with the pheasants. The keeper, after feeding his pheasants, has frequently hid himself, to count his stock of those beautiful birds, and always saw this black-cock come to feed with them ; and so it lasted for two years or more. I have no doubt that this bird is the produce of his intimacy with a hen-pheasant. The old black-cock used to play like a cock-turkey, the keeper tells me, dragging his wings, and could drive all the cock-pheasants, being completely master over them ; which I wonder at, as the pheasant has spurs and he has none. The hybrid was shot on the 26th of October, and had he lived another month, would have been a beautiful bird. You will observe that he crowed on rising as a cock-pheasant does, which I believe a black-cock does not do. As far as I can ascertain in the number of instances of hybrids mentioned in Yarrell's 'British Birds,' they seem all to be the produce of cock-pheasants and grey-hens, whereas there is no doubt this is the reverse.

"I may mention while on this subject, that in another wood on Mr. Halsey's property two Hybrids were produced between the cock-pheasant and hen golden pheasant ; this took place about thirteen years ago. A hen golden pheasant had escaped from confinement, and it was known that she was alive in the coverts ; and in one particular wood it was remarked that the pheasants were always disturbed and driven out of it, and it was not known for some time by what ; till at last, by watching at the feeding-places, it was discovered that this golden hen-pheasant and two other curious-looking birds were so pugnacious, that they drove every thing from the place. They were all three shot, when the other two proved to be cock-birds, and there is no doubt whatever of their parentage, both from their shape and plumage. They are small birds and not handsome, partaking of the plumage of both sorts of pheasants, without any of the beauty of either. I believe this to be the first instance on record of their ever breeding in a wild state ; and you must remember that they were not in a Norfolk covert, full of half-tame pheasants, but in one of the wildest parts of England, as the presence of black-game will tell you. They were shot in the month of November, and therefore had probably got as good plumage as they ever would have. They are now in my possession through the kindness of Mr. Halsey.

"I think it a very curious circumstance that these birds should have been produced in a wild state, as I find in the 'Gardens and Menagerie of the Zoological Society,' vol. ii. Birds, under the head of Golden Pheasant, that in China, where the two sorts are wild, they have never been known to produce a mixed breed, and that in confinement it is sometimes obtained, but with the greatest difficulty. Also,

in the 'Natural History of Ireland,' vol. ii. Birds, by W. Thompson, it is stated, as a reason for the Golden Pheasant not doing well in a wild state in this country if introduced where the common pheasant is now abundant, that they are such a shy, timid bird, and would be easily driven off by the other species. This fear is evidently groundless, as not only the half-bred birds, but the golden hen drove all the other pheasants, as was seen frequently by the keeper; and they were so cunning, and so well able to take care of themselves, that after it was known they were there, and the mischief they did, the covert was beat in the usual way for pheasants, in the hopes of being able to destroy these birds, but without meeting with them, and the keeper was obliged to watch for them and shoot them at feed.

"I remain, your obedient servant,

"JOHN W. G. SPICER."

The following papers were also read:—

1. **ON THE ANATOMY OF THE WART-HOG (*PHACOCHÆRUS PALLASII*,
VAN DER HOEVEN).**
By PROF. OWEN, F.R.S., F.Z.S. ETC.

The female *Phacochærus* died, without previous symptoms of ailment, on Wednesday, February 5th, having lived in the Menagerie of the Society ten months, during which it thrrove, like the male, and grew rapidly; its weight at the time of its death was 105 lbs.

The length of the body from the extremity of the jaws to the root of the tail was 3 feet 6 inches; the length of the head 1 foot; that of the tail 1 foot: this part is naked, very slender, tapering towards the end, which is subcompressed, a little dilated, and ornamented with a tuft of long and slender black bristles, growing chiefly from the opposite margins, as in the Elephant. A layer of lard or fat adhered to the under surface of the corium, as in the Common Hog, preventing the movement of the skin by a panniculus carnosus.

The hair is of one kind, coarse, scanty, and moderately long; the bulb of each is imbedded in a flattened whitish body, about 3 lines broad. The cuticle is impressed by curved lines, giving it the appearance of being composed of imbricated scales from 3 to 4 lines in breadth. There is a strong callosity in front of each carpus, formed by, or connected with, the frequent habit of this animal of walking on its fore-knees. The suborbital wart-like appendage, situated $1\frac{1}{2}$ inch below the eye, is composed of a mass of fibrous and adipose tissue. A double row of strong cilia project from the upper eyelid; but there are none on the lower lid. There is a broad 'membrana nictitans.' An arch of long black hairs forms an eye-brow. The upper lip is bent upwards, or folded over the base of the upper tusk, and many short hairs grow from the thickened margin of this fold. There is a slightly curved callous ridge of the integument, 5 inches in length, parallel with the middle of the lower border of the lower jaw. There are but four nipples, one pair abdominal, about an inch behind the umbilicus; the other pair inguinal.

The anus is situated about an inch below the base of the tail, is a transverse crescentic aperture, with a thick upper border. The vulva is situated about 10 lines below the anus; it is a little peaked below, and the clitoris, like a small caruncle, projects 4 lines within the margin.

There was no appearance of incisors in either jaw; but in the substance of the alveolar border of the lower jaw were four rudimental incisors, 9 lines long by 2 lines wide, which probably were never destined to come through, and are smaller than those in the Caffrarian *Phacochœre*, called 'Harruja,' in the British Museum. The present specimen also differed from that species in having no incisor in the upper jaw; not even the rudiment of one could be found in the substance of the premaxillary. Hence I conclude the species to be that which Van der Hoeven has characterized by the absence of incisors in both jaws, and has called *Phacochœrus Pallasii*. The exerted crown of the canine tusks was $2\frac{1}{2}$ inches long in the upper, and 2 inches long in the lower jaw. Five molars were apparent on each side the upper jaw, and four molars on each side the lower jaw. The first in each jaw was a small, obtusely rounded premolar, with three long diverging fangs above and two below, answering to *p 3*; the second molar in the upper jaw was a much-worn milk-tooth, *m 4*; the third grinder above and the second below were the first true molar, *m 1*, with the crown worn down nearly to the roots. The fourth grinder above and the third below were the second true molar, *m 2*, with a body or crown $1\frac{1}{3}$ of an inch in length before the giving off of the short bent fangs. The last tooth in both jaws was the anterior point of the third true molar just beginning to cut the gum*.

The absence of any incisors above the gum in this young animal, and the presence of four rudimental ones hidden in the lower jaw, just where they are occasionally found in old individuals of the *Phacochœrus Pallasii*, show that this hidden condition and small size are not due to age, but are specific characters.

The roof of the mouth presented about twenty-two pairs of transverse, arched, palatal ridges, with their convexities turned forwards; gradually decreasing as they were placed more backwards, and terminating opposite the end of the molar series; beyond this part the membrane of the palaté was smooth and soft. The tongue is long and narrow, with small, obtuse, well-defined papillæ below its margins, with a smooth dorsum, beset with very fine gustatory papillæ for two-thirds of its extent. At the base of the tongue, 6 inches from the tip, are two large fossulate papillæ, on the same transverse line, and behind these the dorsum of the tongue is beset with numerous soft, moderately large, pointed and retroverted papillæ.

* The grinding surface of the teeth in place closely corresponded with those of the *Phacochœrus Pallasii* figured in my Memoir on the Teeth of the Wart-Hogs (Philosophical Transactions, 1840, pl. 34. fig. 8, *m 1*, *m 2* and *m 3*). The present specimen shows a stage anterior to the one there figured, the last milk-tooth intervening between the first molar and the small premolar in the upper jaw. There was no trace of the germ of a *p 4* above the crown of *d 4* in place, whence it may be concluded that, at corresponding phases of dentition, the *Phac. Pallasii* has fewer grinders than the *Phac. Aelianii*.

Two mucous sacculi, about 1 inch in diameter and $1\frac{1}{2}$ inch in depth, are produced from the upper and back part of the pharynx into the pterygoid fossæ, on each side the basisphenoid. Between the mouths of these sacculi there projects from the back part of the pharynx a glandular prominence or caruncle, about 7 lines long by 5 lines broad. At the lower and back part of the pharynx a third median sacculus is developed, just below the '*constrictores pharyngis*'; in this remarkable structure the Wart-Hog resembles the *Babyrussa**. The œsophagus commences between this sacculus behind and two large post-arytenoid sacculi in front, and is divided from both by a transverse membranous ridge or wall. The long ligamentous crura of the epiglottis are continued from the sides and back part of the post-arytenoid sacculi to that cartilage, which is unusually distant from the larynx. The convex border of the broad epiglottis projects into the posterior nostril. The œsophagus descends behind the trachea to the thorax, and in the posterior mediastinum it is suspended by a fold of the pleura, about $1\frac{1}{2}$ inch broad, which attaches the tube to the descending aorta, after it has passed through the arch.

The stomach is of small size and simple shape; its length in a straight line is 9 inches; following its greater curvature 1 foot 7 inches; the lesser curvature, or the distance from the cardia to the pylorus, being only 3 inches. The left end extends about $3\frac{1}{2}$ inches beyond the cardia, and the right end projects about 2 inches to the right of the pylorus. It presents the usual form of the simple stomach, but the cardiac blind end is marked off by a slight constriction, hardly, however, to the same degree as in the Common Hog; and far from presenting the complexity of the stomach in the Babyrussa. The great omentum is continued from behind the great curvature, and was folded or crumpled up behind and beneath the stomach, enclosing the spleen, which was to the left and a little behind the great end of the stomach. No part of the omentum was visible when the abdominal cavity was exposed, and but little of the stomach could be seen. Almost the only viscera that presented themselves were the large spiral coils of the colon, closely united together by mesocolic bands laden with fat, about an inch in breadth. The caecum was in the left lumbar region. The stomach extended from the left hypochondrium across the epigastric to the right hypochondriac regions. The liver extended from the right hypochondrium to the left, but did not cover all the great end of the stomach. The small intestines lay concealed behind the colon.

The œsophagus, which is 2 inches in circumference at its termination in the stomach, opens nearer the posterior than the anterior surface of the lesser curvature, $3\frac{1}{2}$ inches from the left end, which forms a prominence above the concavity leading to it from the gullet.

The œsophageal epithelium is continued a little way on the inner surface of the stomach, forming a thin, narrow, oval patch, extending $1\frac{1}{2}$ inch to the left of the cardia, $\frac{2}{3}$ rds of an inch to the right and

* See Prof. Vrolik's excellent memoir on that animal, 'Recherches d'Anatomie comparée sur le Babyrussa,' 4to, p. 30, pl. 3.

back part of the cardia, and $\frac{1}{3}$ rd of an inch to the front of the cardia. The rest of the stomach is lined by the usual gastric vascular membrane, which in the distended state shows one or two short and very narrow, straight rugæ, and is smooth in the rest of its extent, except near the commencement of the short and narrow canal leading to the pylorus, where a number of longitudinal rugæ converge. The muscular coat of the stomach is 2 lines in thickness at the cardia, where its texture is unusually firm; it diminishes in thickness to 1 line after a course of 2 inches from the cardia, and is less than half a line thick over the great dilated portion of the stomach. It resumes its thickness of 2 lines at the narrow pyloric portion. A few longitudinal rugæ radiate from the cardia a little way upon the epithelial part, but there is no valvular apparatus there.

The form of the pylorus is crescentic, bounded below by an arched protuberance, receiving in its concavity a single longitudinal protuberance from the upper side.

The bile-tube (*ductus choledochus*) opens on a mammillary eminence half an inch from the pylorus.

The duodenum, which is about 1 inch in diameter at its commencement, where it receives the ductus choledochus and pancreatic duct, contracts to a diameter of $\frac{2}{3}$ rds of an inch as it bends down in front of the right kidney, suspended by a narrow mesentery; it then crosses the first lumbar vertebra, and becomes attached to the back of the ascending colon; there it ascends a little way, bending obliquely round the colon, and becomes suspended, as *jejunum*, upon the proper mesentery. The *jejunum* and *ilium* lie in close coils suspended by the narrow mesentery, which is loaded with fat, terminating next the intestine in lobes which project as a free border on each side the junction of the mesentery to the gut. The mesenteric vessels pass straight through this fat, without forming anastomotic arches. The mesenteric glands are arranged in a semicircle about the root of the mesentery. The small intestines preserve a pretty uniform diameter until near the end of the *ilium*, which gradually contracts to a diameter of about half an inch. The length of the small intestine is from 18 to 20 feet, or about five times the length of the body; which is proportionally one-half the length of the small intestines of the domestic Hog. The *ilium* passes near its termination from the right to the left lumbar region, and ascends to terminate in the *caecum*, to which it is attached by a duplicature of the peritoneum. The *caecum* was situated in the advanced part of the left lumbar region. It was $3\frac{1}{2}$ inches in length, and about $2\frac{1}{2}$ in diameter, with an obtuse rounded end; its parietes were slightly puckered or sacculated on two longitudinal bands, about 4 lines in breadth, a third band commencing near the entry of the *ilium*; its circumference is 7 inches. It is divided by a constricted neck, $3\frac{1}{2}$ inches in circumference and $1\frac{1}{2}$ inch in length, from the *colon*, and this contracted part was sacculated only on one side, the other side being smooth, with a strong coat of longitudinal fibres external to the circular ones. At this part the *ilium*, *caecum* and beginning of the *colon* are attached by a strong mesentery to the spine: the *colon* ascends

in front of the left kidney to the great curvature of the stomach, and bends over to the right side in front of the epiploa, and descending describes a large spiral curve, then a second, third and fourth, progressively diminishing in extent; the last and innermost is folded upon itself, and repeats two spiral coils in the opposite direction, the extent of these increasing; and the gut, quitting the mass of closely connected coils, passes backwards, and bends round the root of the mesentery, adhering to that part and to the pancreas above, then descends in front of the duodenum, much diminished in size, and getting to the back of the lumbar region becomes the rectum, and is continued, tightly bound to the sacrum, behind the genital organs and bladder to the vent. The coils of the colon, which are the first viscera that present themselves, and conceal almost all the others in the abdomen, are attached to one another by bands of mesocolon of about an inch in breadth; and these were laden with lobes of fat. There were many small, dark-coloured glands at the root of the mesocolon, from which straight blood-vessels radiated in groups of from four to eight or ten. The colon, where it forms the first series of coils, is 10 inches in circumference, and is slightly sacculated on two longitudinal bands. The sacculi subside with a slight diminution of diameter in the returning coils.

The length of the 'large intestines' was 13 feet 6 inches, or nearly four times the length of the entire animal.

The mucous membrane of the small intestines is produced in the duodenum into four or five narrow longitudinal folds, which in the jejunum are six or seven in number, and are here or there connected together by oblique folds. Towards the middle of the jejunum these folds disappear, and then reappear at intervals progressively increasing; and in the ileum the mucous lining is even and simply villous. In the partial or interrupted extents of the plicated structure, the rugæ are more reticulate in their arrangement. The lining membrane of the colon was smooth and even, but gorged with blood, and varied in many parts from a deep vinous to an almost black colour. The lining membrane of the rectum was disposed in numerous fine longitudinal rugæ. The small intestines contained only mucus; the large intestines a dark fluid matter of the usual faecal odour, with one or two masses of hard faeces, about the size and shape of a pullet's egg.

The liver weighed 2 lbs. 4 oz. It consisted of three principal lobes, viz. a right, middle and left; the right is the largest, and is partially subdivided at its free extremity, which is closely connected with the right supra-renal body and the summit of the right kidney. The middle lobe is bifid, a gall-bladder 4 inches long by $1\frac{1}{2}$ inch broad being lodged in the cleft; a small 'lobulus Spigelii' projects near the neck of the gall-bladder. The left lobe of the liver terminates on the left side, about 3 inches from the cardiac end of the stomach. The hepatic duct joins the cystic after a course of an inch; the 'ductus communis' is about the same length, and has a width of 3 lines at its termination, which is at the upper part of the beginning of the duodenum.

The pancreas is a long flattened band, from an inch to an inch

and a half in breadth, extending in two directions from the beginning of the duodenum, where its duct terminates. One portion follows the first part of the curvature of the duodenum to the extent of 6 inches; the other and chief part of the gland passes from the pylorus behind the stomach to the spleen, and is 7 inches in length.

The spleen is a long, flattened, ellipsoid body, about 11 inches in length and $2\frac{1}{2}$ inches across its broadest part at the middle. It weighed 3 oz.

The kidneys together weighed $6\frac{1}{2}$ oz.; they are not cleft or lobulated, and are situated symmetrically at the back of the hypochondria. The supra-renal bodies are of an elongate, subcylindrical shape.

The heart is a somewhat flattened cone, with a produced pointed apex formed by the left ventricle. The pericardium adheres to the sternum; it was covered with much fat. There is a large pleural sac between the pericardium and the diaphragm, which contains the azygous lobe of the lung, the long intra-thoracic inferior cava, the cesophagus and descending aorta.

The right lung is divided into three lobes and the 'lobulus azygos'; the left lung into two lobes, the upper and smaller lobe being slightly subdivided. The tracheal rings overlap each other behind. The thymus gland extended from the fore-part of the pericardium into the neck. The thyroid gland consists of one elongate, narrow lobe, concave where it is applied to the fore-part of the trachea, convex where it is covered by the 'sterno-thyroidei'; it is about 2 inches in length and 8 lines wide. The thyroid cartilage is of unusual length, shaped like the side or section of a vase, convex outwards at its lower half, and concave above, by the bending outwards of its broad upper margin; its length is $2\frac{1}{2}$ inches, its breadth $1\frac{1}{2}$ inch. The arytenoid cartilages are still more unusual in their conformation; they are very long, curved backwards, and confluent at their apices; on each side of this prolonged confluent point they are deeply cleft, so as to form two lateral pointed processes or appendages. A fold of membrane is continued from each lateral appendix outwards to the ligamentous crura of the epiglottis; these folds form the outer walls of two large post-arytenoid sacci, which intervene between the larynx and pharynx. A median fold of membrane is continued backwards from the middle line and confluent apices of the arytenoids, and forms the septum between the post-arytenoid sacci. The mucous membrane of the larynx is continued from the anterior and upper border of the thyroid forwards and upwards into the concavity of the basihyal, forming a wide but not very deep anterior sacculus.

The brain weighed $3\frac{1}{2}$ oz.

Female Organs.—The ovary, 9 lines long, 6 broad and 4 thick, is kidney-shaped, and is suspended by the middle of the concave border by a short, thick peduncle, to which is attached the commencement of the ostium abdominale of the oviduct; this orifice is not fimbriated, but has some delicate wrinkled processes on its inner surface. The peritoneal fold continued from this part to the end of the cornu uteri, and which approximates it thereto, forms one side of the opening of a wide ovarian pouch, upon the outer and fore-part of which

the oviduct describes its convolutions in its course towards the uterus. The stroma ovarii contained at its periphery a few adyancing ovisacs about a line in diameter.

Each cornu uteri is about 1 foot 4 inches in length, and of a nearly uniform circumference of 2 inches. It is beset with narrow, wrinkled, oblique, irregular rugæ, forming longitudinal elevations as they approach the body of the uterus, and again becoming oblique—patches of the rugous surfaces alternating with smooth patches.

The common uterus presents large, longitudinal, wrinkled rugæ for the first inch of its extent, and then a spiral valve begins to be formed, about 2 lines in thickness, which describes thirteen close coils before subsiding in the common vagina; the length of the spiral portion, which may be compared to the 'cervix uteri,' is $3\frac{1}{2}$ inches; the length of the vagina is 4 inches. The rugæ of the vagina are longitudinal, and longer at its beginning and end, where they terminate on a well-defined circular fold, dividing the vagina from the urogenital canal, and constricting the orifice; the free borders of the spiral valve are beset by free, fine, longitudinal folds of the lining membrane of the uterus.

The urethra is about 3 inches in length, and becomes closely connected with the vagina 2 inches before it terminates. Its orifice is defended by two longitudinal folds.

In comparison with the Common Hog, the Wart-Hog, as regards its internal anatomy, differs in the more simple form of the stomach, the relatively shorter small intestines, and the relatively longer large ones; but, like the Common Hog, the cæcum is small, and the colon disposed in spiral coils, in both which characters they resemble the Ruminants; the cæcum is broader in proportion to its length than in the Common Hog. In both the Common Hog and Wart-Hog the intestinal canal is more tied down by the fat-laden processes of peritoneum, and appears to have less motion allowed it, than in other quadrupeds. The liver and gall-bladder, the kidneys and the thoracic viscera, much resemble those of the Common Hog. The inner surface of the jejunum shows a reticulate disposition of rugæ in the Common Hog, but not the regular longitudinal folds in the duodenum and beginning of the jejunum, as in the Wart-Hog.

The epiglottis passes into the posterior nares in both the Wart-Hog and Common Hog, and has the hyo-epiglottidei muscles; but the pharynx in the Common Hog does not present the superadded sacculi, nor the larynx those peculiarities which distinguish the Wart-Hogs. These resemble the Babyrussa in the sacculated structure of the pharynx, but differ in the more simple stomach. The Wart-Hog differs from the Common Hog in the smaller size and more simple form of the ovaria, and the fewer mammae. The most marked difference from all other *Suidæ*, and that which best justifies the generic separation, is presented by the dentition of the *Phacochærus*; the modifications of the alimentary canal are not of the same degree.

2. AN ENUMERATION OF SPECIES OF RECENT SHELLS, RECEIVED
BY W. J. HAMILTON, ESQ., FROM BORNEO, IN NOVEMBER
1850, WITH DESCRIPTIONS OF THE NEW SPECIES. BY W.
METCALFE.

1. *HELIX BROOKEI*, Adams and Reeve, Zoology of the Voyage of
the Samarang, Mollusca, p. 60. pl. 15. fig. 4 *a, b*.

2. *HELIX VITTATA*, Adams and Reeve, Zool. of the Samarang,
Mollusca, p. 60. pl. 15. fig. 7 *a, b, c*.

This species, having been previously described by Mr. Benson, in
the 'Magazine of Natural History,' under the name of *H. reglis*,
ought to retain that name.

In addition to the variety figured in the Mollusca of the Samarang,
Mr. Hamilton received two other varieties, in which the pale green
bands are wanting, the brown colour more or less predominating, with
bands of yellowish brown, and a brown circle surrounding the um-
bilicus.

3. *HELIX SCHUMACHERIANA*, Pfeiffer.

4. *HELIX RESPLENDENS*, Philippi in Zeitschr. f. Malak. 1846,
p. 192.

5. *HELIX NASUTA*, nobis. *H. testū subdiscoidea, sinistrorsa,*
carinatā, angustē perforatā, tenuissimā, lineis incrementi et
spiralibus confertis subtilissimè decussatā, pellucidd, hyalinā;
lineā angustā pallidē brunneā ad carinam ornatā; spirā sub-
conicā; anfractibus 5½ planulatis, ultimo acutissimè carinato,
subtus nitescente; aperturā subrhomboidea, ad angulum exte-
riorem valde productā et coarctatā; peristome simplici, tenui,
margine superiore vix reflexo, basali anticē reflexiore, umbili-
cum subtegente.

Long. $1\frac{4}{10}$; lat. $1\frac{1}{10}$; alt. $\frac{5}{10}$ unc.

This elegant species is covered with a thin epidermis, of a pale
straw colour, under which the shell is milky white. It bears some
analogy to *H. Tayloriana* (Adams and Reeve, Zool. of the Sam-
arang, Mollusca, pl. 15. fig. 2 *a, b*), but the projection at the extre-
mity of the aperture is much more acute, and the shell is of a more
gelatinous texture: it differs also in being sinistral.

6. *HELIX GLUTINOSA*, nobis. *H. testū orbiculato-convexā, an-*
gustē perforatā, tenui, nitidissimā, diaphanā, pallidē brunneā,
carinatā; supra carinam fuscā, infraque lineā angustā flaves-
cente, ornatā; spirā conoidea, obtusā; anfractibus 5 parum
convexit; ad carinam supra infraque lineā impressā circulari,
striisque numerosissimis transversis notatā; peristome sim-
plici, acuto, margine columellari vix reflexo.

Long. $1\frac{1}{10}$; lat. 1; alt. $\frac{6}{10}$ unc.

A bright shell, resembling a thin film of glue, with a keel of a
darker shade; slightly indented above and below the keel, the in-

dentation elegantly crossed with slight striae, the effect of which, as well as the darker line, is partially visible throughout the sutures.

7. **HELIX CONICOIDES**, nobis. *H. testā imperforatā, trochiformi, acutē carinatā, tenui, pellucidā, luteo-cornēd; spiraliter leviter striatā, striis ad suturam majoribus, confertioribus; apice mamillari; anfractibus 7, superioribus subconvexis, duobus ultimis planulatis, ultimo subtus convexo, nitido, ad carinam et in medio depresso; aperturā trapeziformi, subtus arcuatā; peristomate simplici, acuto, subtus flexuoso, marginibus callo tenui junctis.*

Long. $\frac{7}{10}$; lat. $\frac{6}{10}$; alt. $\frac{4}{10}$ unc.

8. **BULIMUS CITRINUS**, Bruguière; Reeve, Conch. Icon. Bul. pl. 31. fig. 187 a.

9. **BULIMUS CYANORIS**, Reeve, Conch. Icon. Bul. pl. 37. fig. 223.

10. **CYCLOSTOMA BORNEENSIS**, nobis. *C. testā suborbiculari, depresso-conoideā, acuminatā, albida, fusco-variegatā, maculis ad suturam, cinguloque infra medium fusco ornatā; striis obliquis minutis, aliisque circularibus minutissimis impressā; anfractibus quinque planiusculis, carinatis; ultimo magno, margine acutē carinato, circa umbilicum obtusē angulato; aperturā subcirculari; peritremate albo, reflexo; supra productiore, subtus reflexo, ad columellam subsinuato; umbilico magno, profundo; operculo corneo, tenui.*

Long. $1\frac{6}{10}$; lat. $1\frac{3}{10}$; alt. $\frac{9}{10}$ unc.

Varietas minor, magnitudine solum diversa.

Shell bearing some characters in common with both *C. aquilum*, Sow., and *C. acutimarginatum*, Sow.; but having a more depressed spire, and flatter whorls than either of those species.

11. **CYCLOSTOMA**, apparently *C. parvum*, Sow. Thes. Conch. Cycl. fig. 254, 255.

12. **CYCLOSTOMA UNDATUM**, nobis. *C. testā globoso-pyramidalī, tenui, pellucidā, albā, lineis hyalinis undatis decurrentibus ornatā, tenuiter striatā; anfractibus 6, parum rotundatis, primis conicis regulariter crescentibus; ultimo magno, obtusē carinato; aperturā circulari, supernē angulatā; peritremate lato, expanso, vix nisi ad columellam reflexo; suturis mediocribus; umbilico parvo.*

Long. $\frac{6}{10}$; lat. $\frac{5}{10}$; alt. $\frac{6}{10}$ unc.

This species belongs to the division of the genus of which *C. lave*, Gray, may be considered the type.

13. **CYCLOSTOMA TENUILABIATUM**, nobis. *C. testā discoideā, spirā depresso, planā, colore pallido, supernē castaneo-maculatā et undulatā; epidermide luteo-castanēd, indutā; anfractibus 5 rotundatis, 4 primis lævibus, ultimo lineis impressis irregularibus ruguloso; suturā impressā; aperturā circulari; peritremate dupli; interno simplici, supernē emarginato; ex-*

terno tenui, lato, planiusculo, supra ascendente, fornicato, dein compresso; umbilico patulo; anfractibus intus distinctis.
 Long. $1\frac{1}{10}$; lat. $\frac{8}{10}$; alt. $\frac{3}{10}$ unc.
 Belonging to the genus *Pterocyclos* of Benson.

14. **CYCLOSTOMA BICILIATUM.** *Pterocyclos biciliatum*, Mousson, Land- und Süss. Moll. von Java, p. 49. t. 20: fig. 9.

Several individuals of this species having been received, its locality is thus fixed. It is observable that the complete shell, which was not known to Mousson, exhibits a tubular spiracle near the aperture, similar to that apparent in *C. spiraculum*, Sow.; also, that the aperture is circular, depressed, with the peritreme white, expanded, slightly reflected, and at the upper part faintly undulated.

15. **SCARABUS PLICATUS**, Fer. var. *major*.

This variety, in place of the usual purple colour of the shell, exhibits a deep yellow ground, with four broad bands of dark brown colour.

16. **SCARABUS BORNEENSIS**, A. Adams.

17. **AURICULA SUBNODOSA**, nobis. *A. testa ovato-oblonga, crassata, albata, epidermide castaneo-fuscata, infra suturas decussatim granosa, medio laevi, ad basim striis decussatim; anfractibus convexiusculis, suturis distinctis, subcrenulatis; anfractu ultimo superiore longitudinaliter plicato-subnodoso; apertura medio paululum angustata; columella biplicata.*

Long. $2\frac{4}{10}$; lat. $1\frac{3}{10}$ unc.

A species distinguishable from *A. Midæ* by the convexity of the upper whorls and the smoothness of their lower halves, the depth of the sutures, and the longitudinal nodulous folds which surround the upper part of the final whorl: the aperture is also proportionally wider than in *A. Midæ*. In the single specimen received, the columellar lip has an interior protuberance above the upper fold.

18. **AURICULA POLITA**, nobis. *A. testa ovato-oblonga, basi angustiore, spiræ brevi; epidermide castaneo-fuscata, nitida; striis numerosis minutissimè granulosis circumdata, granis superiorius distinctioribus; apertura medio coarctata; columella triplicata, plicata infima linearis.*

Long. $1\frac{6}{10}$; lat. $\frac{8}{10}$ unc.

Although the characters of the aperture resemble those of *A. Judæ*, the form of the shell differs entirely in its greater breadth, and in the shortness of the spire.

19. **AURICULA FELIS**, Lam.

20. **AURICULA MUSTELINA**, Desh.

21. **NERITINA CREPIDULARIA**, Lam. Conch. Ill. fig. 25.

22. **NERITINA BECKII**, Reclus, Thes. Conch. fig. 13.

23. **NERITINA PIPERINA**, Chemn. Thes. Conch. fig. 166, 167.

24. **NERITINA DUBIA**, Chemn. Thes. Conch. fig. 81-88.

25. **MELANIA CIRCUMSTRIATA**, nobis. *M. testā elongatā, turritā, solidā, fusco-viridi; anfractibus convexiusculis, infra suturam paululum constrictis; superioribus striis 6 transversis elevatis, plicisque 8 majoribus longitudinalibus ornatis; ultimo striis 13; aperturā ovali-oblongā, basi dilatatā, superius acutē angulatā, et ferē rimatā, intus albida; peritremate sinuato, columella callosa.*

Long. $2\frac{6}{10}$; lat. $\frac{8}{10}$ unc.

26. **MELANIA SUBSUTURALIS**, nobis. *M. testā turritā, fusco-viridi, lineis castaneis longitudinalibus obliquis variegatā; anfractibus ferē planis, quorum superiores striis elevatis perpau- cis validis, inferiores pluribus minoribus inaequalibus ornati; ultimo ad basim crebristriato; suturā distinctā, excavatā; aperturā ovali, supernē angulatā, intus albido-cærulescente; peritremate acuto, sinuato, extus effuso.*

Long. $1\frac{4}{10}$; lat. $\frac{5}{10}$ unc.

27. **PALUDINA HAMILTONI**, nobis. *P. testā ovato-conicā, tenui, perforatā, viridi, concolore; striis transversis undulatis, aliisque longitudinalibus tenuissimè decussatā; anfractibus 5 rotundatis, superioribus aetate erosionis; suturā impressā; aperturā ovali, supra angulatā, intus cærulescente, margine paululum incrassato, albido; peristomate acuto, lineā tenui nigra circumdata.*

Long. $\frac{9}{10}$; lat. $\frac{6}{10}$ unc.

The Bornean specimens being scarcely adult, the description is drawn up from individuals in my cabinet, which have long been there without any locality assigned.—W. M.

28. **LITTORINA SCABRA**. *Helix sc.*, Linn.

29. **LITTORINA MELANOSTOMA**, Gray, Zool. of Beechey's Voy.

30. **LITTORINA ALBICANS**, nobis. *L. testā ovato-oblongā, acuminatā, tenui, albida, apice lāvi, nitente; anfractibus 7 vel 8, quorum 5 ultimi striis numerosis paulatim crescentibus ornati; ultimus rotundatus, aetate varicosus, striā unica majore, quasi carinatus, striis ad basim minoribus circumdatā; aperturā rotundato-lunari, lacted; peristomate subreflexo.*

Long. $\frac{7}{10}$; lat. $\frac{4}{10}$ unc.

A delicate species, of a milk-white hue, the older specimens having many varices produced by the previous reflexions of the outer lip.

31. **CERITHIUM OBTUSUM**, Lam.; Zool. of the Samarang, Moll. pl. 13. fig. 3.

32. **CERITHIUM UNICARINATUM**, nobis. *C. testā turritā, tenui, apice truncato, hinc inde varicosā, cinereā, longitudinaliter pliata, interstitiis longitudinaliter striato-rugosis; suturā parum impressā; anfractibus vix rotundatis, regulariter crescentibus; ultimo acutē carinato, infra carinam crebristriato; aperturā*

mediocri subfuscâ; columellâ rectâ; peritreme modicè reflexo, albescente.

Long. $1\frac{6}{10}$; lat. $\frac{5}{10}$ unc.

33. *AMPULLARIA*, probably *A. Celebensis*, Quoy, Voy. de l'Astr. pl. 57. fig. 1-4.

34. *NATICA MACULOSA*, Lam. *pellis-tigrina*, Chem.

35. *NOVACULINA OLIVACEA*, nobis. *N. testâ oblongâ, valdè inaequilaterali, epidermide olivacea, ad extremitates fuscescente, indutâ; natibus erosio; anterius rotundatâ, posterius angulato-rotundatâ; margine superiore ferè recto, posticè paululum descendente, ventrali medio subcompresso; intus albâ, dentibus lamellatis duobus recurvatis in utrâque valvâ, posteriore bifido.*

Long. $\frac{9}{10}$; lat. $3\frac{3}{10}$ unc.

A large example of this species, in the Collection of H. Cuming, Esq., exhibits a character which will probably be found generic; namely, a shelly protuberance in each valve, attached to the interior ligament at nearly its hinder extremity. These shelly substances have not, that I am aware, hitherto been noticed. It is probable that they become detached in most specimens by the removal of the animal.

36. *CYRENA TRIANGULARIS*, nobis. *C. testâ trigonâ, solidiusculâ, epidermide fusco-virescente, transversim striatâ, striis marginalibus lateribusque eminentioribus, sulco ab umbo ad marginem posteriorem leviter impressâ; margine antico descendente, vix excavato, angulo anteriore rotundato; margine superiore subrotundato, posticè ferè biangulato, propter sulcum dorsalem subsinuato; intus lacted, margine continuo nitentiore; dentibus cardinalibus in utrâque valvâ tribus, duobus bifidis; dentibus lateralibus brevibus, tenuissimè rugosis, haud striatis.*

Long. 3; lat. $3\frac{1}{10}$; alt. $1\frac{8}{10}$ unc.

The characters of this shell bear some resemblance to *C. Sumatrensis*, Sow. Gen.; but on comparison with the type of that species, now in the Cabinet of Sylvanus Hanley, Esq., the present is found to differ materially, in its triangular outline, as well as in the characteristic furrow from the umbo to the posterior margin, affecting the curvature of the posterior angle, and producing a slight sinuosity in the margin.

37. *UNIO*.

38. *UNIO*.

I am unwilling to describe as new these two species of the genus *Unio*, from want of acquaintance with the great American collections of the genus.

Although no letter accompanied this box of shells, Mr. Hamilton presumes that they have been sent to him by his friend Sir J. Brooke, Rajah of Sarawak. The remittance is undoubtedly from Borneo.

March 11, 1851.

J. E. Gray, Esq., F.R.S., in the Chair.

The following papers were read:—

1. **A FEW WORDS ON THE SYNONYMY OF DISTICHOCERA, A GENUS OF LONGICORN COLEOPTERA FROM NEW HOLLAND, WITH CHARACTERS OF THREE SPECIES SUPPOSED TO BE UNDESCRIBED. BY EDWARD NEWMAN, F.L.S. ETC.**

(*Annulosa*, Pl. XX.)

Among the invaluable labours of the late Mr. Kirby, none are more useful to the general entomologist than his lucid and masterly descriptions of new and remarkable forms of exotic Coleoptera; and of these, none afford to myself so much instruction and pleasure as that entitled "A Description of several New Insects collected in New Holland by Robert Brown, Esq.," and published in the twelfth volume of the 'Linnean Transactions.' In this admirable paper is the first description I can find of the extraordinary genus *Distichocera*, although, as Mr. Kirby himself informs us, it was known long previously under the same name, and although he himself gives it as "*Distichocera* of MacLeay," a name which I am inclined to conclude existed in manuscript only. Concerning the genus in question I lay no claim to any additional knowledge of the structure, habits or affinities of the insect described by Mr. Kirby; but the labours of collectors, amid the seemingly inexhaustible riches of our Australian colonies, have placed within my reach a greater number and greater variety of specimens. Mr. Kirby has only made us acquainted with a single species, and a single sex of that species. Mr. MacLeay has added a second, which has also been described by Guérin, Boisduval and myself under a variety of names. Three other forms of the genus have occurred to me, making the number five in all. Of these, three are certainly females, and two as certainly males. The object of this communication is to express my views as to associating the sexes, and to make known two supposed species which were previously uncharacterized.

Genus **DISTICHOCERA**, MacLeay (MSS.?).

Distichocera, Kirby, Trans. Linn. Soc. xii. 471.

"Labrum transversum, tetragonum. Labium membranaceum apice bilobum: lobis divaricatis. Mandibulæ trigonæ, edentulæ apice incurvæ acutæ. Maxillæ basi trigonæ, apertæ. Palpi filiformes. Mentum transversum, trapeziforme. Antennæ sensim crassiores, disticho-ramosæ."—Kirby, l. c.

1. **DISTICHOCERA MACULICOLLIS.**

Mas. *Distichocera maculicollis*, Kirby, l. c.

Distichocera maculicollis, Audinet Serville, Ann. Ent. Soc. Fr. iii. 59.

Distichocera maculicollis, Boisduval, Faune de l'Océanie.

“Corpus fere cuneiforme, subitus pilis argenteis nitidum, supra nigrum, obscurum. Caput subcordatum, pilosum, canaliculatum utrinque ante antennas carinatum. Oculi brunnei. Antennæ breviores, nigræ : articulis omnibus apice biramosis (duobus primis brevissime) ; ramis oppositis compressis vertice rotundatis sinistris paulo longioribus, articulo extimo simplici clavato. Thorax subcylindricus : maculis quatuor dorsalibus quadratim ordinatis. Elytra cuneiformia : lineis tribus longitudinalibus elevatis : striga apud scutellum et alia majori in medio apud suturam piloso-argenteis, apice truncata. Femora brunnea. Tibiæ bicalcaratae. Alæ elytris longiores.” — *Kirby, l. c.*

Fem. *Distichocera rubripennis*, MacLeay, App. King's Voyage.

“Rufo-testacea subtomentosa, capitis lateribus oreque nigris, vertice canaliculato, antennis nigris, articulis vix biramosis, ramis sinistris brevissimis ; thorace atro, vittâ utrinque rufo-testaceâ, scutello nigro, elytris rufo-testaceis tomentosis apice obtusis dehiscentibus ; corpore cuneiformi subtus villo argenteo micante, abdome utrinque nigro maculato, pedibus nigris.” — *MacLeay, l. c.*

Distichocera ferruginea, Guérin, Voyage de la Coquille.

Distichocera ferruginea, Boisduval, Faune de l'Océanie, 467.

“Nigra ; capite maculâ frontali, thorace vittis duabus elytrisque dense villoso-fulvis.” — *Boisduval, l. c.*

Distichocera fulvipennis, Newman, Ent. Mag. v. 492.

“Antennæ nigræ ; caput nigrum, fronte fulvo : prothorax niger, lineis 2 dorsalibus, longitudinalibus, latis, fulvis : scutellum nigrum : elytra fulva : abdomen piceum, lanugine argentea vestitum : pedes picei. (Corp. long. 9 unc. ; lat. 3 unc.)” — *Newman, l. c.*

I have cited entire the original specific characters in every instance, in order to save the reader the trouble of making the references. I will now proceed to give more detailed characters.

Male. — Head somewhat cordate, black, velvety, having a slight epicranial sulcus, which is prolonged anteriorly between the bases of the antennæ : face slightly inclined, rather long : eyes arcuate, reniform, pitchy brown, large, approaching on the epicranium, somewhat dilated on the cheeks : antennæ as long as the body, 12-jointed, black ; the first joint short, stout, somewhat obconical ; the second very short ; the following, to the eleventh inclusive, moderately short, still much longer than the second, somewhat cyathiform as regards the shaft, and emitting from its apex two long branches ; these increase in length from the first pair, and those on one side of each antenna are uniformly longer than those on the other ; this discrepancy is particularly observable in the third (or first branched) joint ; the twelfth joint is club-shaped and undivided ; it is longer than either of the others, yet scarcely exceeds in length the branches of the eleventh. Prothorax subquadrate, its anterior and posterior margins nearly equal, its lateral margins somewhat uneven, but not produced into a central

tooth; pronotum somewhat uneven, black, with four greyish spots, which are due to a grey velvety pilosity; the two smaller of these touch the anterior, the two larger the posterior margin, and appear as though forming parts of two vittæ, each of which is interrupted in the middle; prosternum produced between the procoxae and there deeply notched, pitchy red, and clothed with a grey pilosity. Scutellum rounded, black, and glabrous. Elytra black, broad at the base, gradually tapering to the apex, where they are slightly divaricate, truncate, and furnished with a small obtuse and obscure tooth in the middle as well as at each angle of the truncature: each elytron has three carinæ; the first is prominent, originates near the base, and curves towards the suture but without reaching it, terminating in the apical area; the second originates on the disk considerably below the humeral angle, and running parallel with the first, unites therewith in the apical area; the third is nearly obsolete; it is situate on the apical half of the elytron, between the second carina and the costal margin; the costal margin is pitchy red, and clothed with a grey pubescence: the wings are fuliginous, slightly longer than the elytra, and unfolded: the legs are rather long; the metatibiæ slightly incurved, and furnished with two apical spines: the under surface of the thoracic and abdominal segments is of a pitchy red colour, clothed with a sparse grey pubescence; the legs are of a similar colour, but the pubescence is scarcely observable.

Fem.—Head somewhat cordate, black, velvety, with a large fulvous spot occupying the face and extending to the epicranium between the eyes, but not reaching the anterior margin of the prothorax; a deep longitudinal epicranial sulcus extends forwards to between the bases of the antennæ: eyes arcuate, reniform, pitchy black: antennæ more than half the length of the body, 11-jointed; the first joint rather short, somewhat obconical; the second very short; the third the longest, but still not disproportionately so, dilated at the apex; the fourth and fifth of the same form, but shorter; the remainder, to the eleventh, slender at the base, but dilated and somewhat cupshaped at the apex, receiving into the cup the base of the next succeeding joint, and being produced into a strong obtuse lobe, tooth, or serrature on one side; this is very conspicuous, and gives the antenna a subserrated appearance; on the opposite side is a very slight, scarcely perceptible indication of a like lobe; the eleventh joint is sesquialterous. Prothorax nearly equal in length and breadth, the anterior narrower than the posterior margin, the lateral margins uneven and slightly lobed in the middle; pronotum uneven, with a slightly impressed anterior and posterior submarginal transverse sulcus, velvety black, with two broad irregular longitudinal vittæ of a bright fulvous orange colour; prosternum produced between the procoxae, and the process notched. Scutellum short, rounded, black, shining. Elytra at the base much wider than the prothorax, gradually narrowing to the apex, where they are slightly dehiscent, truncated, and the truncature produced in the middle into an obtuse, scarcely perceptible tooth; each elytron has three carinæ; the first is prominent, originating near the base, and curves very gradually to-

wards the suture without reaching it, terminating in the apical area ; the second is indistinct, originates near the humeral angle, and running parallel with the first, ceases in the apical area ; the third is still less distinct, and its limits are obscure ; at both extremities a junction between the first and second carinæ may be made out, but is not very manifest : the wings are fuliginous, slightly longer than the elytra, but scarcely so long as the abdomen ; the entire under-surface is pitchy red clothed with a silvery grey pubescence, but there is an ovoid denuded space on each side of each abdominal segment. Legs pitchy red ; tarsi pitchy black ; metatibiae with two apical spines.

Obs.—I believe that no author has hinted at the union of these very dissimilar insects under one specific name, but I think such a proceeding will be borne out by the evidence. In the first place I would observe that both forms are equally abundant ; that they occur in the same situations and at the same season ; that collectors have several times reported them as only sexually different ; and finally, that all the individuals of *maculicollis* are males, and all the individuals of *fulvipennis* females. Then, as regards structure, the cibarian organs of the two forms closely approximate ; so also does the direction and general figure of the head ; the antennæ indeed are remarkably different, but this discrepancy obtains equally in several genera of longicorns and in many other groups of Coleoptera, the males invariably possessing in such instances the longer, more compound and more ornate antennæ. The discrepancy in the prothorax, which at first is very striking, will be found more in appearance than in fact, and more in colour than in figure ; and even in colour an analogy exists that would be likely to escape the superficial observer ; the two fulvous vittæ so conspicuous in *fulvipennis* appear divided, paler, and semi-obsolete in *maculicollis*, and the difference in the figure of this part is in simple accordance with the more robust habit in the supposed female : the discrepancy in the elytra again is considerable as regards width, and particularly striking as regards colour ; but their structure is normally the same ; the number, direction and comparative length of the carinæ being identical : the legs are precisely alike in the two forms in structure, proportions, size and colouring. So that the reasons for uniting the forms under one specific name are stronger than any that can be urged for keeping them distinct ; and their not having been united by Kirby, MacLeay, Guérin, or Boisduval, merely implies that the idea did not occur to those distinguished entomologists : there is no evidence that they maturely weighed and then rejected the conclusion.

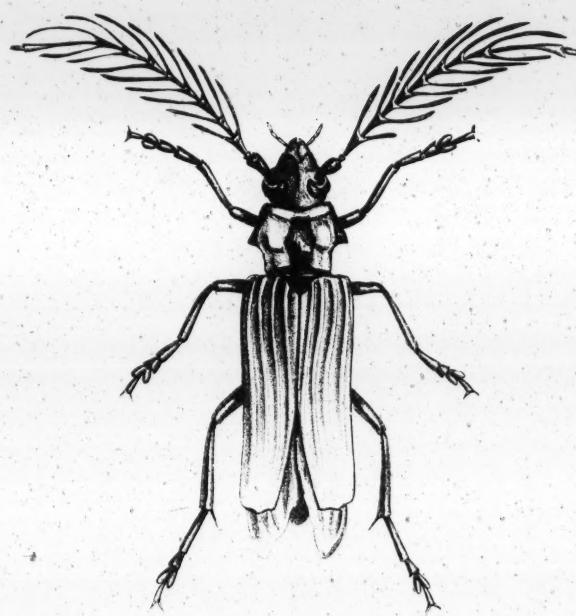
2. *DISTICHOCERA PAR.* *Sexuum amborum color par : testaceo-fusca, maris capite prothoracisque disco saturatioribus ; omnino pilis cinereis obsita.*

Maris long. corp. ·525 unc. ; elytrorum lat. max. ·2 unc.

Feminæ long. corp. ·7 unc. ; elytrorum lat. max. ·225 unc.

Male.—Antennæ, anterior margin of prothorax, elytra, legs, and entire under-surface testaceous brown, the head and disk of the prothorax being darker ; a longitudinal, narrow, silvery spot, due to the





W. Wing, lith.

Ford & West, Imp.

DISTICHOCERA KIRBII, Newman, ♂

presence of a velvety pilosity, is observable in the centre of each elytron; every part of the body is more or less thickly beset with a grey pilosity.

Female.—Almost exactly resembling the male, but the prothoracic disk is not darker than the elytra, and there is no silvery mark in their centre.

In both sexes the carination of the elytra follows that of *D. maculicollis*, but is less pronounced.

Compared with *D. maculicollis* both sexes of this species are of smaller size, and the discrepancy in breadth is rather more obvious than in length; the antennae of the males are very similar, but the apical joint is more clavate in *par*; their colour is decidedly different, in *maculicollis* being black, in *par* testaceous, with the apices of the ramuli slightly darker, the prothorax is more rounded at the sides in *par* than in the older species; but the plainness and purity of colour in *par* are sufficient at once to distinguish it.

Male and female in the cabinet of Mr. Scott, to whom I am indebted for the opportunity of describing it.

3. DISTICHOCERA KIRBYI.

Mas. Caput nigrum, longitudinaliter sulcatum, antennæ dimidio corporis longiores, 11-articulatae, articulis 3-10 biramosis, 11o sesquialtero: prothorax niger vittis 2 latis fulvis, dorso inæqualis lateribus medio 1-dentatus: scutellum nigrum: elytra fulva, 5-carinata, apice dehiscentia, singulo truncato, truncaturā bisinuatā: pedes nigri.

Corp. long. 1.15 unc.; elytrorum lat. max. 3 unc.

Fem. Caput nigrum, longitudinaliter sulcatum, antennæ dimidio corporis vix longiores, 11-articulatae articulis 4-8 apice emarginatis: prothorax niger vittis 2 latis fulvis, lateribus medio 1-dentatus: scutellum nigrum lateribus fulvum: elytra fulva 5-carinata apice dehiscentia, singulo truncato, truncaturā bisinuatā, pedes nigri.

Corp. long. 1.25 unc.; elytrorum lat. max. 375 unc.

Male.—Head black, with the exception of a scarcely perceptible fulvescent tinge on the short velvety down of the epicranium; a deep epicranial longitudinal sulcus extends forwards between the antennæ: eyes arcuate, reniform, pitchy black, large, approaching on the epicranium, dilated and gibbose on the cheeks: antennæ more than half the length of the body, 11-jointed; the first joint rather short, stout, somewhat in the common shape of a reversed cone; the second joint very short; the following, to the tenth inclusive, short, somewhat cup-shaped towards the base, and emitting at the apex two long branches, which are slightly incrassated externally; the eleventh joint is much longer than either, slender towards the base, somewhat club-shaped and very decidedly sesquialterous: prothorax uneven on the back, somewhat restricted just behind the anterior margin; lateral margins produced in the middle into a decided strong but obtuse tooth; the posterior half of each lateral margin concave, yet the anterior and posterior margins are straight and nearly equal in breadth; the colour

of the prothorax is black, with the exception of two broad fulvous irregular vittæ extending from the anterior to the posterior margin : prosternum black, shining, projecting between the anterior coxæ, and the projection deeply emarginate : scutellum rather long, blunt at the apex, perfectly black : elytra fulvous, slightly divaricating, conspicuously carinated, truncate at the apex, and the truncature sinuate carinated ; the carinæ five discoidal, one costal and one sutural ; the first discoidal originates at the base, and nearly runs into the sutural at about one-third of its length ; the second unites with the first at the base and runs into the apical area of the wing ; the third originates at the base and runs into the apical area ; the fourth originates in the humeral angle, dividing at one-third of its length, and the two branches counting as two carinæ, there uniting with the two previously described in a confused manner in the apical area : the wings are fuliginous, slightly longer than the elytra, and scarcely folded at the tip : the abdomen and legs are black, the latter of moderate size and proportion : the metatibiæ are armed with two spurs.

Fem.—Head black, with the exception of a fulvescent tinge on the short velvety down of the epicranium : eyes reniform, or almost arcuate, ferruginous (probably by accident) : antennæ rather more than half as long as the body and moderately stout, 11-jointed ; the first joint moderately long ; the second very short ; the third about equal in length to the first, and together with the fourth, fifth, sixth, seventh and eighth inclusive, deeply notched at the apex, and receiving the base of the next preceding joint in the notch : prothorax uneven on the back, somewhat curved anteriorly, and the anterior half of each lateral margin uniting therewith in producing a somewhat semicircular outline ; the posterior half of each lateral margin is concave, and a strong but obtuse central tooth is produced on each side at the point of union of the convex and concave portions of the margin ; the posterior margin is nearly straight ; the colour is velvety black, with two broad fulvous vittæ, extending from the anterior to the posterior margin : prosternum black, thickly sprinkled with a grey pilosity, projecting somewhat between the procoxæ, and the projection emarginate : scutellum rather long, rounded at the apex, velvety black with fulvous margins : elytra bright fulvous, conspicuously carinated, slightly divaricating, truncate at the apex, and the truncatures sinuate : the carinæ on each elytron are five in number, and are thus disposed ; the first is near the suture and parallel therewith for rather more than a third of its length ; it unites with the second at the base, and this runs into the apical area and there joins the third ; the third originates at the base, exceeds the second slightly in length, and joins the fourth in the apical area ; the fourth originates near the humeral angle and divides at about a third of its length ; both branches proceed to the apical area, and there unite with the second and third : wings fuliginous, exceeding the elytra in length, and scarcely folded at the tip : legs black.

Hab. Australia. I have seen but a single specimen of the male, which is in the Cabinet of the Zoological Society, and one of the female, in the Cabinet of the British Museum.

4. DISTICHOCERA MACLEAYII.

Fem. *Caput nigrum, fronte ferrugineum, longitudinaliter sulcatum: antennae desunt: prothorax ferrugineo-lanuginosus, lateribus bimaculatus, haud dentatus: scutellum ferrugineo-lanuginosum lateribus nigrum, glabrum: elytra ferruginea 5-carinata apice vix dehiscentia vix truncata: pedes nigri.*

Corp. long. 1.35 unc.; elytrorum lat. max. 5 unc.

Fem.—Head, including the eyes, black; the face clothed with ferruginous down; epicranium impressed with a longitudinal sulcus, which is very deep between the eyes; the eyes are moderately large and reniform, the lower or cheek lobe being the largest; the face has a large and deep depression occupying the basal or upper portion of the clypeus; the first and second joints of the antennæ alone are present: prothorax black, clothed with ferruginous down, without any trace of that central black velvety vitta which obtains in the females of other described species; the anterior portion of the prothorax is smooth and somewhat ring-like; the rest of the dorsal surface uneven and tuberculated on each side; it has two obtuse tubercles: prosternum produced between the procoxae into two short incurved, backward-directed processes which approximate at their apices, leaving an aperture through which the point of a needle may be passed: scutellum semicircular, clothed with ferruginous, with the exception of the margin, which is glabrous; elytra ferruginous and clothed with ferruginous down, wide at the base, narrowing to the apex and then truncate, the angles of the truncature being obtuse; the elytra are carinated, each having five carinae; the first is very short and nearly obtuse; it commences near the scutellum and ceases before it has reached a third of the length of the elytron; the second and third commence near the base of the wing and unite in the apical area; the third and fourth commence almost together just below the humeral angle, and unite in the apical area; the two pairs are also united, and below their union several other raised anastomosing lines form a kind of network: the abdomen and legs are black, with a short hairy pubescence; metatibiae with two distinct apical spines.

Hab. Australia. A single specimen of the female, taken by Mr. Ince, R.N., in that gentleman's cabinet.

Perhaps I may be permitted to avail myself of the opportunity of stating that I am assiduously engaged in the preparation of a descriptive list of the longicorn Coleoptera of our Australian colonies, and that I shall feel deeply indebted to any members of the Zoological Society who would kindly assist me by the communication of specimens. As the extent and value of her colonies have always been a distinguishing character of Great Britain, so I think should the industry of her sons take precedence of other nations in making known to the world the abundant riches of those colonies in the field of Natural History.

2. A CATALOGUE OF THE SPECIES OF *EMARGINULA*, A GENUS OF
GASTROPODOS MOLLUSCA, BELONGING TO THE FAMILY
FISSURELLIDÆ; IN THE COLLECTION OF H. CUMING, ESQ.
BY ARTHUR ADAMS, R.N., F.L.S. ETC.

Genus *EMARGINULA*, Lamarck.

Head proboscisidiform; tentacles subulate, with the eyes on tubercles at their external bases; foot with a range of cirri round the sides; mantle-margin simple; branchial plumes two; anal siphon with its angulated membranous sides projecting from the edges of the fissure; tongue with a central laminar subquadrate tooth and numerous lateral teeth.

Shell conical, with an elevated slightly recurved entire vertex turned towards the posterior end; surface cancellated; aperture emarginated in front by a slit, which runs for some distance up the shell; interior without a partition; muscular impression crescentic, interrupted in front.

Emarginulus, Montf.—*Patella*, sp. Linn.

1. *EMARGINULA FISSURA*, Linn.

Patella fissura, Linn. Syst. Nat. ed. 12. p. 1261.—*Emarg. fissura*, Flem.—*Emarg. lœvis*, Recluz.—*Emarg. curvirostris*, Macgil.

Hab. British Islands. Mus. Cuming.

2. *EMARGINULA RETICULATA*, Chemn.

Emarg. reticulata, Chemn.; Sowerby, Genera (Emarg.), f. 5.

Hab. Malta, on stones. Mus. Cuming.

3. *EMARGINULA CANCELLATA*, Philippi.

Emarg. cancellata, Phil. En. Moll. Sicil. pl. 7. fig. 15.—? *Patella crystallina*, Wood.

Hab. Sicily, and island of Paros. Mus. Cuming.

4. *EMARGINULA FISSURATA*, Chemn.

Patella fissurata, Chemn. 11. 1929—30; Sowerby, Genera (Emarg.), fig. 3.—*Emarg. rubra*, Lam. Hist.

Hab. Seas of Europe. Mus. Cuming.

5. *EMARGINULA CURVIROSTRIS*, Deshayes.

Emarg. conica, Blainville, Man. pl. 48. fig. 4.

Hab. —?

6. *EMARGINULA ROSEA*, Bell.

Emarg. rosea, Bell, Zool. Journ. vol. i. 1824.—*Emarg. pileolus*, Michaud.—*Emarg. capuliformis*, Philippi.

Hab. British Islands. Mus. Cuming.

7. *EMARGINULA CRASSA*, J. Sowerby.

Emarg. crassa, J. Sowerby, Min. Conch. pl. 33; Forbes and Hanley, Brit. Moll. pl. 63. fig. 2.

Hab. Norwegian Seas. Mus. Cuming.

8. EMARGINULA HUZARDII, Payrandeau.

Emarg. Huzardii, Payr.*Hab. —?*

9. EMARGINULA SOLIDULA, Costa.

Emarg. solidula, Costa.*Hab. Catania. Mus. Cuming.*

10. EMARGINULA ELONGATA, Philippi.

Emarg. elongata, Phil. En. Moll. Sicil. pl. 110. fig. 2.*Hab. Mediterranean. Mus. Cuming.*

11. EMARGINULA VANICORENSIS, Quoy et Gaimard.

Emarg. Vanicorensis, Quoy et Gaimard, Voy. de l'Astrol. pl. 68.*fig. 19, 20.**Hab. Vanicoro. Mus. Cuming.*

12. EMARGINULA STRIATULA, Quoy et Gaimard.

Emarg. striatula, Quoy et Gaimard, Voy. de l'Astrol. pl. 68.*fig. 21, 22.**Hab. —? Mus. Cuming.*

13. EMARGINULA CUVIERI, Savigny.

Emarg. Cuvieri, Savigny, Egypt, tab. 3. fig. 2.*Hab. Egypt. Mus. Cuming.*14. EMARGINULA CLYPEUS, A. Adams. *E. testa elongato-elliptica, valde depressa, testacea, macula luteola in medio dorsi, vertice subcentrali, postice inclinata; costis confertis, aequalibus, radiantibus, imbricato-asperis, ornata; basi arcuata; aperturae margine crenulata, anticè valde fissurata; fissura magna; apertura intus bimaculosa.**Hab. Isle of Burias, Philippines, on dead shells, 7 fathoms, sandy mud. Mus. Cuming.*15. EMARGINULA SCABRIUSCULA, A. Adams. *E. testa elongato-elliptica, depresso-conica, testacea, vertice subpostico, retrorsum inclinata; costis inaequalibus, radiantibus, imbricato-subaculeatis, asperis, et lineis elevatis, concentricis, cancellata; apertura antice angustata, basi arcuata, margine creno-denticulata.**Hab. —? Mus. Cuming.*16. EMARGINULA OBOVATA, A. Adams. *E. testa elongata, obovata, depresso-conica, testacea, vertice subcentrali, retrorsum inclinata, costellis radiantibus, imbricato-asperis, et lineis elevatis, concentricis, cancellata; apertura postice rotundata, anticè angustata, margine creno-denticulata, anticè profundè incisa.**Hab. Catbalonga, isle of Samaar, on stones, 4 fathoms. Mus. Cuming.*

17. **EMARGINULA INCISURA**, A. Adams. *E. testa elongato-ovali, planulata, pallide fulva, vertice antico retrorsum inclinato, costellis inaequalibus, radiantibus, longitudinalibus, imbricato-asperis, et lineis elevatis, concentricis, decussata, basi arcuato, aperturæ margine crenulato, anticè declinato, valde fissurato, incisuræ magna, longa, haud usque ad verticem producta, marginibus intus callosis.*

Hab. —? Mus. Cuming.

18. **EMARGINULA MICANS**, A. Adams. *E. testa elongato-ovali, pallide fuscæ, nitida, vertice posticè declinato, costellis radiantibus et lineis elevatis transversis, regulariter cancellata, canelli quadrati; aperturæ margine denticulato, incisuræ magna et longa.*

Hab. Rains Island, North Australia (Lieut. Ince). Mus. Cuming.

19. **EMARGINULA PUNCTATA**, A. Adams. *E. testa ovato-conica, albido-grisea, pulcherrimè viridi punctata, vertice subcentrali, posticè inclinato; costis longitudinalibus (majoribus cum minoribus alternatis) concinnè granulatis; aperturæ margine crenulato, excavato, anticè valde fissurato.*

Hab. San Nicholas, island of Zebu, under stones, low water. Mus. Cuming.

20. **EMARGINULA VARIEGATA**, A. Adams. *E. testa ovato-conica, albida, rufo-fusco variegata, vertice acuto, subcentrali, posticè inclinato, costellis radiantibus, aequalibus, imbricato-asperis, ornata; aperturæ margine denticulato, anticè fissurato, fissuræ brevi subquadrata.*

Hab. Isle of Camaguan, Philippines, on exposed rocks, low water. Mus. Cuming.

21. **EMARGINULA PUNCTICULATA**, A. Adams. *E. testa elevato-conica, capuliformi, alba, fusco punctulata, costellis planulatis, crebris, longitudinalibus, radiantibus, ornata; aperturæ ovali, margine crenulato, anticè profundè fissurato; fissuræ magna et longa.*

Hab. Calapan, island of Mindoro, Philippines, on stones, 12 fathoms. Mus. Cuming.

22. **EMARGINULA FULIGINEA**, A. Adams. *E. testa elliptica, valde depressa, fuliginea, apice subcentrali, posticè inclinato, costellis aequalibus, radiantibus, granulosis, confertis, et lineis incrementi concentricis, ornata; aperturæ ovali, intus viridi, margine crenulato, anticè fissurato, incisuræ intus in canalem producta.*

Hab. —? Mus. Cuming.

23. **EMARGINULA GALERICULATA**, A. Adams. *E. testa obliquè conica, capuliformi, vertice valde curvato, ultra marginem posteriorem decumbente, costellis angustis, crenulatis, radiantibus, interstitiis lineis elevatis, transversis, concinnè clathratis;*

costâ anticâ, supra incisuram, granulato-punctatâ; aperturâ margine crenulato, anticâ profundè inciso.

Hab. Calapan, isle of Mindoro, on stones, 12 fathoms. *Mus. Cuming.*

24. **EMARGINULA PULCHRA**, A. Adams. *E. testâ depresso-conicâ, viridi, albo pulcherrimè radiatim pictâ, vertice subcentrali, posticè inclinato, costis radiantibus, inæqualibus, aculeato-asperis, interstitiis lineis elevatis transversis clathratis; aperturâ margine denticulato, anticâ inciso, fissurâ brevi subquadratâ.*

Hab. Isle of Camaguan, Philippines, on exposed rocks, low water. *Mus. Cuming.*

25. **EMARGINULA CONCINNA**, A. Adams. *E. testâ ovato-depressâ, albidd, vertice postico, ad marginem declinato, costis sulcosis, distantibus, radiantibus (circa 12), interstitiis lineis longitudinalibus, et transversis, concinnè decussatis; aperturâ margine dentato, anticâ profundè inciso.*

Hab. —? Mus. Cuming.

26. **EMARGINULA VIMINEA**, A. Adams. *E. testâ ovato-conicâ, albidd, vertice centrali, retrorsum inclinato, costellis radiantibus, nodulosis, subæqualibus, et lineis crassis, transversis, regulariter cancellatâ; cancelli profundi, punctiformes; aperturâ margine crenato, anticâ profundè inciso.*

Hab. Philippine Islands. *Mus. Cuming.*

27. **EMARGINULA EXCURVATA**, A. Adams. *E. testâ elongato-ellipticâ, depresso-conicâ, testacea, apice acuto, subpostico, retrorsum inclinato, costis radiantibus, et liris concentricis, elevatis, cancellatâ, liris ad costas nodulosis, basi arcuato; aperturâ margine excurvato, crenulato, anticâ profundè inciso.*

Hab. —? Mus. Cuming.

28. **EMARGINULA DILECTA**, A. Adams. *E. testâ elongato-ovali, subquadrangulari, albâ, valdè depresso-conicâ, testacea, apice acuto, subpostico, retrorsum declinato, costis subdistantibus, radiantibus, asperulatis, et liris elevatis, concentricis, pulcherrimè cancellatâ; basi arcuata; aperturâ margine denticulato, anticâ valdè fissurato.*

Hab. King George's Sound, South Australia. *Mus. Cuming.*

29. **EMARGINULA SCABRICOSTATA**, A. Adams. *E. testâ ovali, valdè depresso-conicâ, fasciis tribus, lutescentibus, radiantibus, anticâ ornatâ; vertice subcentrali, posticè inclinato, costis radiantibus, distantibus, corrugatis, interstitiis valdè clathratis et corrugatis; aperturâ margine dentato et denticulato, anticâ valdè inciso.*

Hab. Isle of Corrigidor, Bay of Manila, on dead shells, sandy mud, 12 fathoms. *Mus. Cuming.*

30. **EMARGINULA CANDIDA**, A. Adams. *E. testâ ellipticâ, depresso-conicâ, obliquâ, albâ, vertice subpostico, retrorsum decli-*

nato, costis radiantibus, imbricato-asperis (majoribus cum minoribus alternatis), interstitiis clathratis; aperturæ margine denticulato, anticè profundè inciso.

Hab. Port Adelaide, Australia, on the sands. Mus. Cuming.

31. **EMARGINULA BELLULA**, A. Adams. *E. testa elongato-elliptica, subdepressa, albida, vertice subpostico, declinato, costis distantibus prominentibus, lineisque transversis concinnè sculptis; carinâ, supra incisuram, punctatâ; aperturæ margine denticulato, intus sulcato, anticè profundè inciso.*

Hab. Catanuan, province of Toyabos, island of Luzon, on dead shells, 10 fathoms. Mus. Cuming.

32. **EMARGINULA RETECOSA**, A. Adams. *E. testa elevata-conica, elliptica, albida, vertice subcentrali, posticè inclinato, costis radiantibus, æqualibus, subnodosis, ornata; interstitiis regulariter cancellatis, cancelli in serie unico dispositi; aperturæ margine crenulato, incisurâ profunda.*

Hab. Bolinao, province of Tambalas, island of Luzon, sandy mud, 10 fathoms. Mus. Cuming.

33. **EMARGINULA EXIMIA**, A. Adams. *E. testa elongato-ovali, valde depressa, albâ, subpellucida, vertice postico retrorsum inclinato, costis radiantibus, distantibus, prominentibus, imbricato-nodosis, interstitiis liris transversis et longitudinalibus latè cancellata; tota superficie lineolis radiantibus et concentricis pulcherrimè decussata; aperturæ margine denticulato, anticè profundè inciso.*

Hab. San Nicholas, island of Zebu, under stones, low water. Mus. Cuming.

34. **EMARGINULA PLANULATA**, A. Adams. *E. testa elongato-ovali, complanata, vertice subcentrali, posticè inclinato, albida, costellis radiantibus, æqualibus, imbricato-asperis, lineisque concentricis incrementi decussata, basi arcuato; aperturæ margine anticè valde inciso; incisurâ latâ et profunda.*

Hab. Singapore, coarse sand and shells, 7 fathoms. Mus. Cuming.

35. **EMARGINULA CUCULLATA**, A. Adams. *E. testa obovali, obliquè conica, albâ, vertice producto, subpostico, intorto; costis prominentibus, nodulosis, radiantibus, interstitiis cancellatis; aperturæ lateribus anticè angustatis, margine denticulato, posticè rotundato, anticè profundè fissurato, incisurâ longâ et latâ.*

Hab. Singapore, on shells, 7 fathoms. Mus. Cuming.

36. **EMARGINULA ACULEATA**, A. Adams. *E. testa elongato-ovali, depressa, rufescente, vertice subpostico, retrorsum inclinato; costis radiantibus, aculeato-asperis, prominentibus, interstitiis valde clathratis; aperturæ margine denticulato, anticè fissurato, fissurâ profunda.*

Hab. —? Mus. Cuming.

37. **EMARGINULA LÆVICOSTATA**, A. Adams. *E. testa parva, elliptica, valde depresso, apice subpostico, retrorsum inclinato, costis lœvibus, radiantibus (circa 14), interstitiis costellis longitudinalibus, et lineis transversis latè clathratis; aperturae margine denticulato, lateribus anticè angustatis, anticè valde inciso.*

Hab. —? *Mus. Cuming.*

Subgenus CLYPIDINA, Gray.

Shell ovate, conical, surface with radiated ribs; vertex acute, central, not recurved; aperture with the margin crenulated; muscular impression fungiform, anal groove and emargination inclining towards the right anterior margin (in the natural position of shell).

1. **CLYPIDINA NOTATA**, Linn.

Patella notata, Linn. *Chemn. Conch. vol. x. p. 321. Vign. 25.*
fig. C. D.

Hab. West Indies. *Mus. Cuming.*

2. **CLYPIDINA RUGOSA**, Quoy and Gaimard.

Emarginula rugosa, Quoy and Gaim. *Voy. de l'Astr. p. fig.*
Emarg. conoidea, Reeve, *Conch. Syst. pl. 160. fig. 7.*
Hab. Australia. *Mus. Cuming.*

3. **CLYPIDINA ASPERA**, Gould.

Emarginula aspera, Gould, *Expedition, Shells*, p. 12.
Hab. Sydney, New South Wales. *Mus. Cuming.*

4. **CLYPIDINA FUNGINA**, Gould.

Emarginula fungina, Gould, *Expedition, Shells*, p. 12.
Hab. Upolu. *Mus. Cuming.*

5. **CLYPIDINA SULCIFERA**, A. Adams. *C. testa ovali, depresso-conicæ, viridescenti, vertice obtuso, ad partem posteriorem posito; costellis radiantibus, interstitiis haud æquantibus, et striis incrementi ornatis; basi arcuatæ; aperturae margine crenulato, incisuræ haud profundæ, sublaterali, intus in canalem productæ.*

Hab. —? *Mus. Cuming.*

6. **CLYPIDINA RUDIS**, A. Adams. *C. testa crassæ, rudi, albida, depresso-conicæ, costis octo angulatis, radiantibus, interstitiis costellis longitudinalibus et lineis concentricis decussatis; apice subcentrali; basi arcuato; aperturae margine crenato, anticè sinuato, sinu intus in canalem producto.*

Hab. —? *Mus. Cuming.*

7. **CLYPIDINA STELLATA**, A. Adams. *C. testa solidulæ, albida, ellipticæ, depresso-conicæ, apice subcentrali, costis elevatis, subspinulosis, radiantibus; interstitiis costellis et striis crebris decussantibus, exasperatis; aperturae margine dentato, sinu sublaterali, intus in canalem apicem versus producto.*

Hab. Australia. *Mus. Cuming.*

8. **CLYPIDINA SCABRICULA**, A. Adams. *C. testā elongato-ovali, obliquè conicā, costis radiantibus, elevatis, distantibus, asperulatis, interstitiis costellis longitudinalibus et lineis scabriusculis valdè cancellatā; vertice subcentrali, posticè inclinato; aperturæ margine dentato-crenulato; incisurā profundā, intus in canalem productā.*

Hab. Australia. *Mus. Cuming.*

9. **CLYPIDINA ANNULATA**, A. Adams. *C. testā crassā, ellipticā, albida, annulo luteo-fusco circumcinctā; costis elevatis asperis radi tibus distantibus, interstitiis costellis longitudinalibus et lineis transversis elevatis concinnè clathratis; aperturæ margine duplicato, incrassato, pulcherrimè fimbriato, sinu quadrato intus in canalem producto; aperturā intus annulā albida.*

Hab. Australia. *Mus. Cuming.*

10. **CLYPIDINA ACUMINATA**, A. Adams. *C. testā elevato-conicā, albida, viridi annulatā, costis longitudinalibus radiantibus, imbricato-asperis, interstitiis tricostulatis, costellis imbricato-asperis; sulcis transversis concentricis, distantibus, impressā; vertice acuminato, acuto, subcentrali; aperturæ margine valdè crenulato, sinu subquadrato, intus in canalem producto.*

Hab. Australia. *Mus. Cuming.*

11. **CLYPIDINA CANDIDA**, A. Adams. *C. testā ellipticā, solidulā, conicā, candidā, costellis asperulatis inæqualibus, radiantibus, et striis elevatis transversis, concentricis, decussatā; vertice subcentrali; aperturæ margine crenulato, sinu brevi, intus in canalem producto.*

Hab. Port Adelaide, Australia. *Mus. Cuming.*

Subgenus **TUGALI**, Gray.

Shell oblong, narrow anteriorly, back elevated, cancellated; apex posterior and recurved; aperture with the margin crenulated, and deeply sinuated anteriorly.

1. **TUGALI ELEGANS**, Gray.

Tugali elegans, Gray, Cat. Moll. New Zealand.

Hab. New Zealand. *Mus. Cuming.*

2. **TUGALI INTERMEDIA**, Reeve.

Parmophorus intermedius, Reeve, Proc. Zool. Soc. 1842; Conch.

Syst. pl. 139. fig. 5, 6.

Hab. —? *Mus. Cuming.*

3. **TUGALI OSSEA**, Gould.

Emarginula ossea, Gould, Expedition, Shells, p. 13.

Hab. Feejee Islands. *Mus. Cuming.*

4. **TUGALI CINEREA**, Gould.

Emarginula cinerea, Gould, Expedition, Shells, p. 13.

Hab. —? *Mus. Cuming.*

5. TUGALI PARMOPHOROIDEA, Quoy et Gaimard.

Emarginula parmophoroidea, Quoy et Gaim. Voy. de l'Astrol.
pl. 68. fig. 15, 16.

Hab. Eastern Seas.

6. TUGALI CARINATA, A. Adams. *T. testā elongato-ovali, dorso carinatā, costis longitudinalibus, radiantibus, confertis, et striis transversis, concentricis, decussatā; apice postice declinato; basi arcuatā; aperturāe margine crenulato, extremitate anteriori sinuato, sinu intus in canalem producto.*

Hab. Philippines. Mus. Cuming.

7. TUGALI CICATRICOSA, A. Adams. *T. testā elongato-ovali, albā, dorso valdē depresso, costellis radiantibus et lineis concentricis elevatis decussatā, vertice subpostico depresso excavato quasi cicatricoso, subpellucido; basi arcuato; aperturāe margine crenulato, extremitate anteriori sinuato, sinu intus in canalem producto.*

Hab. Philippines. Mus. Cuming.

8. TUGALI SCUTELLARIS, A. Adams. *T. testā elongato-ovali, virido-fuscā, tenui, dorso planulatā, vertice postico, acuto, vix elevato, costellis radiantibus subdistantibus, et striis concentricis incrementi, decussatā; extremitate anteriori vix sinuato; aperturā intus fuscā, margine subcrenulato.*

Hab. Bais, Philippines. Mus. Cuming.

9. TUGALI RADIATA, A. Adams. *T. testā elongato-ovali, luteolā, valdē depresso, costis radiantibus, rotundatis, elevatis, distantibus, et striis concentricis, ad incrementum ornatā; aperturā intus albidd, margine crenulato, extremitate anteriori vix sinuato.*

Hab. Catuanan, Philippines. Mus. Cuming.

10. TUGALI DECUSSATA, A. Adams. *T. testā elongato-ovali, albidd, planulatā, dorso carinatā, costellis longitudinalibus, radiantibus, et lineis elevatis concentricis eleganter clathratā; vertice acuto, postico; aperturāe margine crenulato, anticē sinuato, sinu intus in canalem producto.*

Hab. Philippine Islands. Mus. Cuming.

Subgenus SUBEMARGINULA, Blainville.

Shell conical, compressed, vertex inclined towards the posterior margin; aperture with the anterior margin folded in the form of a gutter or channel; surface cancellated.

Hemitoma, Swainson.

1. SUBEMARGINULA EMARGINATA, Blainv.

Emarginula emarginata, Blainv. Man. de Malac. pl. 48 bis. fig. 2.
Hab. Honduras. Mus. Cuming.

2. **SUBEMARGINULA OCTORADIATA**, Gmel.

Patella octoradiata, Gmel.; Lister, 532.11.—*Emarg. Listeri*, Ant. *Hab.* —? Mus. Cuming.

3. **SUBEMARGINULA DEPRESSA**, Blainv.

Emarginula depressa, Blainv. Man. de Malac. pl. 48 bis. fig. 3. *Hab.* Honduras. Mus. Cuming.

4. **SUBEMARGINULA CLATHRATA**, Adams and Reeve.

Emarginula clathrata, Adams and Reeve, Moll. Zool. Voy. Sama-rang, pl. 11. fig. 6. *Hab.* Mindoro Sea. Mus. Cuming.

5. **SUBEMARGINULA PANIHENSIS**, Quoy et Gaimard.

Emarginula Panihensis, Quoy et Gaim. Voy. de l'Astrol. pl. 67. fig. 7, 8. *Hab.* Island of Panhi. Mus. Cuming.

6. **SUBEMARGINULA TRICOSTATA**, Chemn.

Patella tricostata, Chemn.; Sowerby, Gen. of Shells, No. 34. fig. 6. *Hab.* —?

7. **SUBEMARGINULA AUSTRALIS**, Quoy et Gaimard.

Emarginula australis, Quoy et Gaim. Voy. de l'Astrol. pl. 68. fig. 11, 12. *Hab.* Australia. Mus. Cuming.

8. **SUBEMARGINULA ELARGIE**, Quoy et Gaimard.

Emarginula elargie, Quoy et Gaim. Voy. de l'Astrol. pl. 68. fig. 9, 10. *Hab.* Philippines. Mus. Cuming.

9. **SUBEMARGINULA GALEATA**, A. Adams. *S. testa griseo-rufesc-ente, elevato-conică, tenui, vertice subcentrali, posticè inclinato, costis tuberculosis, radiantibus, albidis, et lineis transversis, elevatis, subclathratis, costă antică prominenti; aperturæ mar-gine dentato, anticè valde sinuato, sinu intus in canalem pro-ducto.*

Hab. Philippine Archipelago. Mus. Cuming.

10. **SUBEMARGINULA ARABICA**, A. Adams. *S. testa albida, crassă, depresso-conică, vertice obtuso subcentrali, posticè in-clinato; costis radiantibus tuberculosis et liris elevatis trans-versis clathrată; aperturæ margine incrassato, crenato, anticè sinuato, sinu intus in canalem producto.*

Hab. Red Sea. Mus. Cuming.

11. **SUBEMARGINULA ALVEOLATA**, A. Adams. *S. testa tenui, alba, subpellucidă, depresso-conică, vertice subcentrali, posticè inclinato; costis radiantibus lirisque transversis irregulariter alveolată; costis ad liras nodulosis; alveolis pellucidis; aper-turæ margine dentato, anticè sinuato, sinu intus in canalem producto.*

Hab. Honduras. Mus. Cuming.

12. **SUBEMARGINULA IMBRICATA**, A. Adams. *S. testā ovato-oblongā, subquadrangulari, cinereo-albidā, vertice parvo, centrali, posticē inclinato; costis radiantibus imbricato-asperis, inaequalibus, et lineis crassis irregularibus incrementi decussatā; aperturāe margine dentato, anticē valdē sinuato, sinu subquadrato, intus in canalem producto.*

Hab. Mouth of Victoria River, north-east coast of Australia, under stones, low water. Mus. Cuming.

13. **SUBEMARGINULA PUMILA**, A. Adams. *S. testā orbiculato-ovali, valdē depressā, apice subcentrali, posticē inclinato; costis radiantibus, nodosis, inaequalibus, et lineis elevatis concentricis incrementi, decussatā; aperturāe margine denticulato-crenato, anticē profundē sinuato; sinu subquadrato, intus in canalem producto.*

Hab. —? Mus. Cuming.

14. **SUBEMARGINULA CATILLUS**, A. Adams. *S. testā elongato-ovali, valdē depressā, vertice vix elevato, posticē inclinato; costis radiantibus nodulosis, crassis, et lineis incrementi transversis, ornatā; aperturāe margine irregulari, crenulato, intus calloso, anticē valdē sinuato.*

Hab. —? Mus. Cuming.

15. **SUBEMARGINULA DENTICULATA**, A. Adams. *S. testā elongato-ovali, albā, novem-radiatā, vertice acuto posticē inclinato, costis novem, crassis, rugulosis, radiantibus; intervallis costellatis, costellis longitudinalibus, asperulatis; aperturāe margine dentato, et denticulato, anticē emarginato, incisurāe lateribus incrassatis, anticē in dentes duos productis.*

Hab. Mexico. Mus. Cuming.

16. **SUBEMARGINULA POLYGONALIS**, A. Adams. *S. testā elongato-ovali, depresso-conicā, albā, octoradiatā, vertice subcentrali, posticē inclinato, costis radiantibus subnodulosis, longitudinalibus (octo majoribus), lineis concentricis incrementi asperā; aperturā octagonalī, margine crenulato, anticē valdē sinuato, sinu intus in canalem producto.*

Hab. Catanuan, Philippines. Mus. Cuming.

17. **SUBEMARGINULA CRASSILABRUM**, A. Adams. *S. testā ellipticā, crassā, rudi, albā, depresso-conicā, vertice subcentrali, eroso, costis radiantibus distantibus, inaequalibus, subaculeatis, ornatā; aperturāe margine crenato-denticulato, posticē recto, anticē rotundato, sinuato, sinu intus in canalem producto.*

Hab. —? Mus. Cuming.

18. **SUBEMARGINULA NODULOSA**, A. Adams. *S. testā ovatā, obliquē conicā, albido-rufescēti, vertice subcentrali, posticē declinato; costis longitudinalibus nodosis, radiantibus, duabus latere anterioribus permagnis, liris irregularibus transversis,*

decussatā; aperturæ margine irregulari, posticè acuminato, anticè truncato, sinuato, sinu intus in canalem producto.

Hab. Sibonga, island of Zebu, on small stones, 10 fathoms. *Mus. Cuming.*

19. **SUBEMARGINULA CRATITIA**, A. Adams. *S. testā ovatā, conicā, albida, vertice obtuso, centrali, posticè haud inclinata, costis radiantibus distantibus, nodulosis; interstitiis costellis duabus longitudinalibus, et lineis elevatis, transversis, eleganter cancellatis; aperturæ margine crenulato, anticè sinuato, sinu quadrato, intus in canalem producto.*

Hab. —? Mus. Cuming.

20. **SUBEMARGINULA SCULPTILIS**, A. Adams. *S. testā ovali, obliquè conicā, albida, viridi radiatim maculatā; vertice subcentrali, posticè valde declinato; costis radiantibus, longitudinalibus, corrugatis; interstitiis pulcherrimè punctato-clathratis; costā antice prominenti, crenulatā; aperturæ margine undulato et crenulato, posticè rotundato, anticè truncato et sinuato, sinu intus in canalem producto.*

Hab. Calapan, island of Mindoro, on small stones, 12 fathoms. *Mus. Cuming.*

3. **DESCRIPTION OF A NEW SPECIES OF BULIMUS FROM CALLAO,**
COLLECTED BY ERNESTE DENICKE.

COMMUNICATED BY J. E. GRAY, Esq., V.P.Z.S.

Mr. Erneste Denicke, a sailor on board a Hamburg vessel trading with Chili, called at the British Museum, and informed me that he had a new species of *Bulimus*, which he had discovered on the White-sand Hill at Chala, near Callao. He further stated that he had collected the Chilian shells, and had studied shells in general, and that he was convinced that it was a new species. Having compared the shell with the species in the English collections and the descriptions in Pfeiffer, and being satisfied that M. Denicke was correct in his idea, I propose that it should be named after that conchologist.

It was pleasing to see the intimate knowledge which he had acquired of the genera and species of shells, and the interest which he took in the study, when we consider the laborious nature of his occupation, and the very little time that he had at his command. The only holidays he had while his ship was in London were spent at the British Museum, at Mr. Cuming's collection, and in the gardens of the Zoological Society.

BULIMUS DENICKEI.

Shell conical, trochiform, white, the upper whorls small, forming a rather produced tip, the others rapidly enlarging, slightly convex, forming a conical spire, the last angularly keeled; axis perforated; mouth rhombic; outer lip slightly reflexed, acute; throat deep rose-coloured.

Hab. Chala, near Callao, on the Whitesand Hills.

To the preceding communication by Mr. Gray, the following details were added by Mr. Lovell Reeve:—

BULIMUS DENICKEI. *Bul. testa pyramidali-conica, subampliter umbilicata, apice papillari, anfractibus superne convexo-declinibus, medio acutangulis, carinatis, undique peculiariter corrugatis et malleatis, opaco-albis, immaculatis, apertura suboblongo-ovata, labro tenui, simplici, effuso, apertuæ fauce intense purpureo-rosea.*

Hab. Found imbedded in sand at the top of a lofty hill near the Port of Chala, Peru, by Mr. Ernesto Denicke.

This interesting species of *Bulimus* is of about the same size and form, and belongs to the same type, as *B. lemniscatus*, inhabiting Ilo, Peru. Specifically it is very distinct, the entire surface of the shell being peculiarly indented and shrivelled, and of an opake unspotted white. The interior of the aperture is of a deep purple-rose colour.

4. ON A NEW SPECIES OF MUSOPHAGA.
BY JOHN GOULD, F.R.S.

Mr. Gould exhibited to the meeting a drawing by Lieut. J. R. Stack, of a new and beautiful species of *Musophaga*, of which a living example had been for the last ten years in the possession of Lady Ross, at St. Helena. Mr. Gould also exhibited some feathers shed from the wings and tail of the bird, an examination of which, and of the drawing, satisfied him that the bird was quite distinct from all previously described members of the genus.

Lady Ross, who is at present in England, had informed Mr. Gould that the bird was about the size of a hen-pheasant, and that it had been brought to St. Helena from the western coast of Africa, but the precise locality in which it had been procured was unknown to her.

For this interesting addition to the *Musophagæ* Mr. Gould proposed the specific appellation of *Rossæ*, in honour of its amiable owner, who has promised that in the event of her not returning to St. Helena, she will have the bird brought to England, where its arrival will be hailed with pleasure by every lover of ornithological science.

MUSOPHAGA ROSSÆ.

Body, wings and tail rich deep blue; primaries and secondaries arterial blood-red, narrowly margined and more broadly tipped with purplish brown, as in the other species of the genus; crown surmounted with a high rounded crest of hair-like blood-red feathers; bill and denuded orbits yellow; irides brown.

March 25, 1851.

William Yarrell, Esq., Vice-President, in the Chair.

The following papers were read :—

1. CATALOGUE OF THE SPECIES OF *NASSA*, A GENUS OF GASTEROPODOUS MOLLUSCA BELONGING TO THE FAMILY BUCCINIDÆ, IN THE COLLECTION OF HUGH CUMING, ESQ., WITH THE DESCRIPTION OF SOME NEW SPECIES. BY ARTHUR ADAMS, F.L.S. ETC.

Subgenus *NASSA*.

Shell cassiform ; spire short ; inner lip with the callus greatly developed.

A. Shell ribbed or nodulous.

1. *NASSA ARCULARIA*, Linn.

Bucc. arcularia, Linn. ; List. Conch. pl. 970. f. 24 ; Kien. Bucc. pl. 28. f. 115.

Hab. Mauritius ; Philippines, on the reefs (*H. C.*).

2. *NASSA PULLUS*, Linn.

Bucc. pullus, Linn. ; Gualtieri, Test. pl. 44. fig. R ; Kien. Mon. Bucc. pl. 28. f. 114.

Hab. — ?

3. *NASSA CORONATA*, Brug.

Bucc. coronatum, Brug. ; Gualtieri, Test. pl. 44. fig. C, D ; Kien. pl. 28. f. 112.

Hab. Philippines, on the reefs (*H. C.*).

4. *NASSA MUTABILIS*, Linn.

Bucc. mutabile, Linn. ; List. Conch. t. 975. f. 30 ; Kien. pl. 24. f. 30.

Hab. Red Sea ; Philippines, coarse sand, 6 fathoms (*H. C.*).

5. *NASSA MARGINULATA*, Lam.

Bucc. marginulatum, Lam. ; Gualtieri, pl. 44. fig. n ; Kien. Mon. Bucc. pl. 29. f. 117.

Hab. Cagayan, Philippines (*H. C.*).

6. *NASSA TIARULA*, Kien.

Bucc. tiarula, Kien. Mon. Bucc. pl. 30. f. 4.

Hab. Isle of Ticao, Philippines, under stones (*H. C.*).

7. *NASSA POLYGONATA*, Lam.

Bucc. polygonatum, Lam. Voy. de l'Astrol. pl. 32. f. 28, 29.

Hab. Port Jackson, New Holland.

8. **NASSA LUTEOSTOMA**, Kien.

Bucc. luteostoma, Kien. Mon. Bucc. pl. 30. f. 1.
Hab. Coast of Senegal.

9. **NASSA PAUPERATA**, Lam.

Bucc. pauperatum, Lam.; Gualtieri, pl. 44. fig. m.
Hab. Signet Bay, North Australia (*Mr. Dring*).

10. **NASSA LIVESCENS**, Phil.

Bucc. livescens, Phil. Zeit. f. Malac. 1848, p. 135.
Hab. Philippines (*H. C.*).

11. **NASSA CANDENS**, Hinds.

Nassa candens, Hinds, Voy. Sulph. Zool. Moll. pl. f.
Hab. Marquesas Islands.

12. **NASSA GEMMULATA**, Lam.

Bucc. gemmulatum, Lam.; Petiver, Amb. pl. 64. f. 7; Kien. Mon.
Bucc. pl. 22. f. 84.
Hab. Indian Seas.

13. **NASSA ANTILLARUM**, Phil.

Bucc. antillarum, Phil. Zeit. f. Malac. 1848, p. 139.
Hab. West Indies.

14. **NASSA STURMII**, Phil.

Bucc. Sturmii, Phil. Zeit. f. Malac. 1848, p. 135.
Hab. Philippines (*H. C.*).

15. **NASSA NODIFERA**, Phil.

Bucc. nodiferum, Phil. Zeit. f. Malac. 1848, p. 136.
Hab. Island of Ticao, Philippines (*H. C.*).

16. **NASSA MÆSTA**, Hinds.

Nassa mæsta, Hinds, Moll. Zool. Sulph. pl. f.
Hab. Central America.

17. **NASSA LYRILLA**, Beck.

Nassa Lyrilla, Beck.
Hab. East Indies.

18. **NASSA ISABELLEI**, d'Orb.

Bucc. Isabellei, d'Orb. Voy. Amér. Mérid. t. 61. f. 19.
Hab. Central America.

19. **NASSA CREMATA**, Hinds.

Nassa cremata, Hinds, Zool. Voy. Sulph. pl. 9. f. 8, 9.
Hab. Philippines.

20. **NASSA VENUSTA**, Dunker.

Bucc. venustum, Dunker; Phil. Abild. t. 2. f. 1.
Hab. Corregidor Island, 6 fathoms, coarse sand (*H. C.*). Mus. Cum.

21. **NASSA GRUNERI**, Dunker.
Bucc. Grunerii, Dunker; Phil. Abild. (Buccinum) t. 2. f. 2.
Hab. Island of Ticao. Mus. Cuming.

22. **NASSA CRASSA**, Koch; Phil. Abild. (Buccinum) t. 2. f. 4.
Bucc. crassum, Koch.
Hab. Swan River; Philippines. Mus. Cuming.

23. **NASSA MARGARITIFERA**, Dunker.
Bucc. margaritiferum, Dunker; Phil. Abild. (Buccinum) t. 2. f. 12.
Hab. —?

24. **NASSA CAPERATA**, Philippi.
Bucc. caperatum, Phil. Abild. t. 2. f. 18.
Hab. Philippines.

25. **NASSA JONASI**, Dunker.
Bucc. Jonasi, Dunker; Phil. Abild. (Buccinum) t. 2. f. 10.
Hab. —?

26. **NASSA GEMMA**, Philippi.
Bucc. gemma, Phil. Abild. (Buccinum) t. 1. f. 5.
Hab. Island of Ticao, under stones, low water. Mus. Cuming.

27. **NASSA SEMIGRANOSA**, Dunker.
Bucc. semigranosum, Dunker; Phil. Abild. t. 1. f. 9 (Buccinum).
Hab. —?

28. **NASSA ALBESCENS**, Dunker.
Bucc. albescens, Dunker; Phil. Abild. (Buccinum) t. 2. f. 15.
Hab. —?

29. **NASSA SPLENDIDULA**, Dunker.
Bucc. splendidulum, Dunker; Phil. Abild. t. 3. f. 13.
Hab. —?

30. **NASSA CORONULA**, A. Adams. *N. testá ovato-conicá, cincí-
 rescente, fascid supra albida, infra fusco ornata; spirá brevi;
 anfractibus ad suturas angulatis, longitudinaliter costatis, costis
 distantibus rotundis supra nodulosis; labio callo crasso obtecto;
 columella rugosá; labro extus marginato, intus lirato.*
Hab. Corrigidor, Bay of Manila, under stones, low water (*H. C.*).
 Mus. Cuming.

31. **NASSA DISPAR**, A. Adams. *N. testá ovato-conicá, ventricosá,
 láevi, lutescente, rufo cinereoque varie picta; anfractibus supernè
 gibbosis; labio callo albo mediocri tecto; columellá transversim
 corrugatá; labro anticè dentato, intus lirato.*
Hab. Philippines, sandy mud (*H. C.*). Mus. Cuming.

32. **NASSA STIGMARIA**, A. Adams. *N. testá ovato-ventricosá,
 rufescente, albo fuscoque variegatá et punctatá; liris granosis*

transversis ornata, granis planis quadratis; labio laevi, callo albo nitido obtecto, labro margine dentato.

Hab. Island of Siquijor, Philippines, under stones (H. C.). Mus. Cuming.

33. **NASSA SQUIJORENSIS**, A. Adams. *N. testa ovata, subturrata, rufescente, fascia pallida cincta, longitudinaliter costellata; sutura tuberculis moniliformibus ornata, costellis permultis confertis, intersticiis transversim striatis; columella corrugata, labro anticè valde dentato.*

Hab. Island of Siquijor, Philippines (H. C.). Mus. Cuming.

34. **NASSA RETECOSA**, A. Adams. *N. testa ovata, acuminata, spiræ acuta, rufescente, sutura canaliculata, cingulis albis transversim et longitudinaliter cancellata; labro crenato, anticè dilatato et sinuato; labio callo, subexpanso, anticè recto.*

Hab. Albay, Luzon, coarse sand, 6 fathoms (H. C.). Mus. Cum.

35. **NASSA VERRUCOSA**, A. Adams. *N. testa ovato-acuminata, spiræ producta; sutura canaliculata, rufescente, fusco sparsim punctata, liris transversis granosis ornata, granis rotundis verruciformibus in seriebus obliquis longitudinalibus dispositis; labio valde calloso, tuberculato, albo; labro margine serrato.*

Hab. Eastern Seas.

36. **NASSA VARIEGATA**, A. Adams. *N. testa ovato-ventricosa, albido-grisea, fuscoque variegata, longitudinaliter striata, liris transversis granosis subdistantibus ornata, granis rotundis in seriebus obliquis longitudinalibus dispositis; labio tuberculato callo tenui expanso tecto, labro margine crenato.*

Hab. Dalmaguete, island of Negros, Philippines (H. C.). Mus. Cuming.

37. **NASSA CÆLATA**, A. Adams. *N. testa ovata, acuminata, subturrata, albida, fascia rufa cincta, sutura tuberculis moniliformibus ornata, longitudinaliter costellata; costellis simplicibus, intersticiis concinna clathratis, labio callo tenui obtecto, labro margine crenulato.*

Hab. Cagayan, Mindanao, sandy mud, 25 fathoms (H. C.). Mus. Cuming.

38. **NASSA RANIDA**, A. Adams. *N. testa ovata, acuminata, subturrata, rufescente, cingulis transversis granosis sculpta, granis elongatis subquadratis in seriebus obliquis longitudinalibus dispositis; columella rugosa; labio non calloso, labro valde dentato.*

Hab. Burias, 6 fathoms, coral sand (H. C.). Mus. Cuming.

39. **NASSA SORDIDA**, A. Adams. *N. testa ovata, albida, fusco fasciata; sutura tuberculis moniliformibus ornata; longitudinaliter costata, transversim valde lirata; labio callo albo crasso tecto; columella corrugata; labro margine calloso reflexo.*

Hab. Siquijor, on the reefs.

40. **NASSA CUMINGII**, A. Adams. *N. testā ovatā, ventricosā albida, rufa nebulosa; suturā canaliculata, liris transversis granosis sculpta, granis quadratis in series longitudinalibus dispositis; apertura ringente; labio corrugato, tuberculifero; labro intus valde sulcato.*

Hab. China. *Mus. Cuming.* Unique specimen.

41. **NASSA CRENELIFERA**, A. Adams. *N. testā ovatā, acuminata, subturrata, albida, fascia pallida rufa cincta; suturā canaliculata, margine crenellifero, transversim striata, longitudinaliter tenuissimè costata; columella sublaevi; labro integro.*

Hab. —? *Mus. Cuming.*

42. **NASSA SULCIFERA**, A. Adams. *N. testā ovato-ventricosa; spirā producta, cinerescente, luteo-fusco variegata, longitudinaliter subplicata, transversim lirata; anfractu ultimo infra suturam sulco impresso; labii callo crasso mediocri; columella anticè biplicata; labro intus lirato.*

Hab. Algoa Bay.

43. **NASSA CORTICATA**, A. Adams. *N. testā ovato-conica, spirā producta, epidermide viridi-fusco obtecta; anfractibus supernè nodosis; anfractu ultimo anticè cingulata subnodosa ornata, posticè nodulis coronata; labio vix calloso; columella anticè biplicata; labro extus marginato, intus lirato.*

Hab. New Zealand.

44. **NASSA LABECULA**, A. Adams. *N. testā ovato-conica, obliqua; spirā subacuminata, pallide fuscata; anfractu ultimo fascia fuscata obsoleta cincta; anfractibus planulatis supremis costatis, ultimo supernè costata, inferne plano; labii callo expanso, tenui, nitida labecula fuscata ornata; labro posticè incrassata, intus dentata.*

Hab. Burias, 6 fathoms, coral sand (H. C.). *Mus. Cuming.*

45. **NASSA MULTICOSTATA**, A. Adams. *N. testā ovata, acuminata, albo rufa variegata, longitudinaliter costata; costis planis obliquis confertis permultis; labio cum callo parvo tecto; columella laevi, anticè biplicata; labro intus sulcato, margine acuto integro.*

Hab. Batangas, island of Luzon, 4 fathoms, coarse sand (H. C.). *Mus. Cuming.*

46. **NASSA COSTATA**, A. Adams. *N. testā ovato-conica, spirā acuta, producta, pallida, anfractu ultimo macula rufa-fuscata ornata; anfractibus convexiusculis, longitudinaliter costatis, interstitiis planis; anfractu ultimo anticè transversim striato; labio cum callo circumscripto tecto; columella transversim rugosa; labro anticè dentato, intus lirato.*

Hab. Island of Burias, sandy mud, 6 fathoms (H. C.). *Mus. Cuming.*

47. **NASSA CALLOSA**, A. Adams. *N. testā parva, ovata, spirā acuta, alba fusco-maculata, longitudinaliter costata, transversim sulcata; labio cum callo magno albo nitido expanso tecto; columella*

anticè triplicatâ; labro margine incrassato calloso, intus dentato-lirato.

Hab. Bais, island of Negros, 7 fathoms, sandy mud (*H. C.*). Mus. Cuming.

48. **NASSA GEMMULIFERA**, A. Adams. *N. testâ ovato-conicâ, spirâ acutâ, productâ, cinerescente rufo variegatâ, longitudinaliter plicatâ, transversim cingulatâ, cingulis ad plicas noduliferis; labio cum callo expanso albo tecto; columellâ transversim corrugatâ; labro intus lirato.*

Hab. Burias, 6 fathoms, coarse sand (*H. C.*). Mus. Cuming.

49. **NASSA FISSILABRIS**, A. Adams. *N. testâ ovato-conicâ, obliquâ, cinerescente, pallidè fasciatâ, longitudinaliter costatâ, anfractu ultimo anticè transversim sulcato; labio cum callo expanso obtecto; columellâ anticè tuberculis duobus transversis; labro anticè sinuato, posticè valde inciso.*

Hab. Cagayan, Prov. Misamis, island of Mindanao, 25 fathoms, sandy mud (*H. C.*). Mus. Cuming.

50. **NASSA NODICOSTATA**, A. Adams. *N. testâ ovato-conicâ, alba, fasciâ pallidâ fulvâ cinctâ; anfractibus planulatis, longitudinaliter costatis, transversim evanide liratis; costis nodis distantibus instructis, supernè nodosis; labio cum callo circumscripto tecto; columellâ rugosâ, anticè acutâ, productâ; labro extus limbato, anticè valde sinuato.*

Hab. Island of Corrigidor, 6 fathoms, coarse sand (*H. C.*). Mus. Cuming.

51. **NASSA DELICATA**, A. Adams. *N. testâ ovato-conicâ, subpelicata, albida, fasciâ angustâ, fusca, maculisque fuscis ornata, longitudinaliter costata, costis planulatis supernè nodosis, interstitiis lineis elevatis transversis clathratis; labio calloso; columellâ anticè plicis quatuor; labro margine acuto, intus longitudinaliter sulcato, transversim lirato.*

Hab. Sorsogon, Albay, Luzon, coarse sand, 6 fathoms (*H. C.*). Mus. Cuming.

52. **NASSA CANCELLOATA**, A. Adams. *N. testâ ovato-conicâ, spirâ acutâ, fulvescenti, fusco variegatâ, longitudinaliter costata, costis planis rotundatis, interstitiis concinnè cancellatis; labio callo magno expanso crasso obtecto; columellâ laevi, simplici; labro margine calloso incrassato, anticè subsinuato.*

Hab. Masbate, under stones (*H. C.*). Mus. Cuming.

53. **NASSA CLATHRATULA**, A. Adams. *N. testâ ovata, spirâ acutâ, anfractibus convexis, nivis, longitudinaliter costata; costis nodulosis, interstitiis valde clathratis; labio cum callo mediocri obtecto; columellâ anticè biplicata; labro extus varicoso, intus lirato.*

Hab. Island of Siquijor, deep water, sandy mud (*H. C.*). Mus. Cuming.

54. *NASSA CRENOLIRATA*, A. Adams. *N. testa parva, ovata, pallida, lineis angustis transversis fuscis ornata, longitudinaliter costata, costis nodulosis, superne nodosis; aperturam angustatam; labio cum callo obtecto; columella plicis quatuor transversis instructo; labro extus marginato, intus valde dentato-lirato.*
Hab. —? Mus. Cuming.

55. *NASSA SINUSIGERA*, A. Adams. *N. testa ovato-conica, obliqua; spirae acuminata, pallida, fusco variegata, longitudinaliter costata, costis superne nodulosis, transversim sulcata; labio cum callo mediocri tecto; columella transversim corrugato-plicata; labro anticè valde sinuato.*
Hab. Catbalonga, island of Samaar, 8 fathoms, coarse sand (H. C.).

Mus. Cuming.

56. *NASSA GENICULATA*, A. Adams. *N. testa parva, ovato-conica, fulva, albo variegata; fascia latam, transversa, cinereo-fusca cincta, transversim striata, longitudinaliter costata; costis geniculatis; labio subcalloso, anticè bituberculato; labro extus incrassato, intus dentato-lirato.*
Hab. Island of Ticao, 4 fathoms, sand (H. C.). Mus. Cuming.

57. *NASSA SPECIOSA*, A. Adams. *N. testa ovato-conica, acuminata, lutescens, albo variegata, transversim lirata, liris confertis granulosis, longitudinaliter plicata; plicis distantibus obliquis, superne nodosis, nodulis albis; aperturam albam, anticè rufo-fusco maculatam; columella laevi, callo subexpanso tecta; labro intus evanide lirato, margine anticè maculata fusca.*
Hab. —? Mus. Cuming.

58. *NASSA OBTUSATA*, A. Adams. *N. testa ovato-conica, spirae obtusa, pallida, rufo-fusco variegata, transversim lirata, longitudinaliter costata, costis distantibus superne nodosis; labio callo crasso albo obtecto; labro intus incrassato, sulcato et transversim lirato.*
Hab. Island of Ticao, coral sand, 7 fathoms (H. C.). Mus. Cuming.

59. *NASSA ABYSSICOLA*, A. Adams. *N. testa parva, ovato-conica, sordida alba; costellis confertis longitudinalibus permultis, interstitiis concinnis clathratis ornata; labio arcuato, mediocriter calloso; labro intus dentato-lirato, extus incrassato.*
Hab. Loay, island of Bohol, clayey ground, 60 fathoms (H. C.).
Mus. Cuming.

60. *NASSA PUSIO*, A. Adams. *N. testa parva, ovato-conica, fulva, fusco variegata et maculosa; costellis planis, longitudinalibus confertis ornata; anfractu ultimo anticè sulcata, labio cum callo nitido subexpanso tecto; labro intus sulcato, margine subreflexo.*
Hab. Sorsogon, Albay, isle of Luzon, 6 fathoms, coarse sand (H. C.). Mus. Cuming.

B. Shell spinulose ; inner lip with the callus moderate, defined.

61. **NASSA SUBSPINOSA**, Lam.

Bucc. subspinosum, Lam. ; Kien. Mon. Bucc. pl. 26. f. 103.

Hab. Gindulman, island of Bohol, Philippines, low water (H. C.).

62. **NASSA MURICATA**, Quoy et Gaim.

Bucc. muricatum, Quoy et Gaim. Voy. de l'Astr. pl. 32. f. 32, 33.

Hab. Puerto Galero, island of Mindoro (H. C.).

63. **NASSA VIBEX**, Say.

Bucc. vibex, Say.

Hab. West Indies, Philippines.

64. **NASSA AMBIGUA**, Montag.

Bucc. ambiguum, Mont. ; Kien. Bucc. Mon. pl. 21. f. 81.

Hab. British Islands.

65. **NASSA HORRIDA**, Dunker.

Bucc. horridum, Dunker ; Phil. Abild. t. 2. f. 8.—*Bucc. scabrum*, Dunker, olim.

Hab. Eastern Seas.

66. **NASSA HISPIDA**, A. Adams. *N. testa ovato-acutæ, albido-cineræ, rufo-fusco punctatæ, nodispinosæ, longitudinaliter plicatæ, plicis cum seriebus novem tuberculorum spiniformium armatis.*

Hab. Loon, island of Bohol, on the reefs, low water (H. C.).

Mus. Cuming.

Plicated, the rows of tubercles rather close together, the upper row distinct from the rest.

67. **NASSA ECHINATA**, A. Adams. *N. testa elongato-ovata, albida, nodispinosæ, longitudinaliter plicatæ, plicis quinque, seriebus tuberculorum spiniformium armatis.*

Hab. Galeo, island of Mindoro, 3 fathoms, sandy mud (H. C.).

Plicated, with the upper row of tubercles larger and distinct from the others.

Subgenus **EIONE**, Risso.

Shell with the back gibbous ; inner lip with the callus greatly developed, surrounding the circumference of the shell.

1. **EIONE GIBBOSULA**, Linn.

Bucc. gibbosulum, Linn. ; List. Conch. t. 973. f. 28 ; Kien. Mon. Bucc. pl. 28. f. 116.

Hab. —?

2. **EIONE CLATHRATA**, Kien.

Bucc. clathratum, Kien. Mon. Bucc. pl. 27. f. 108.

Hab. —?

3. **EIONE GRANIFERA**, Kien.

Bucc. graniferum, Kien. Mon. Bucc. pl. 27. f. 111.

Hab. —?

4. EIONE THERSITES, Brug.

Bucc. Thersites, Brug.; List. Conch. t. 971. f. 26; Kien. Mon. Bucc. pl. 28. f. 113.

Hab. —?

5. NASSA CIRCUMCINCTA, A. Adams. *N. testā ovatā, cinereā, nitidā, dorso gibbosā; spirā brevi, acutā, suturā fuscā; labio cum callo crasso albo nitido tecto, marginibus usque ad spiram decurrentibus fusco marginatis; columellā lāvi, anticē uniplicatā; labro calloso marginato, intus lāvi.*

Hab. Red Sea. Mus. Cuming.

6. NASSA DORSUOSA, A. Adams. *N. testā ovatā, depresso-depressā, dorso in medio nodatā, olivacea, lāvi, longitudinaliter subplicatā; labio cum callo magno crasso lutescente tecto, marginibus incrassatis usque ad spiram decurrentibus; columellā lāvi, labro margine calloso incrassato, intus sublirato.*

Hab. Masbate, on the mud-banks at low water (H. C.). Mus. Cuming.

7. NASSA ORBICULATA, A. Adams. *N. testā semiorbiculari, convezo-depresso-depressā, lāvi, olivacea, apud dorsum gibba; spirā brevi, labio cum callo expanso crasso tecto, marginibus usque ad spiram decurrentibus, columellā lāvi, labro extus calloso incrassato.*

Hab. —? Mus. Cuming.

8. NASSA CALLOSPIRA, A. Adams. *N. testā ovatā, pallida, fascia transversā cinereā ornatā; spirā acutā, transversim liratā, plicis nodosis longitudinalibus instructā; labio cum callo magno albo extenso tecto, marginibus usque ad spiram decurrentibus; columellā anticē biplicatā; labro crasso calloso, marginato, intus valde lirato.*

Hab. Island of Burias, 6 fathoms, coral sand (H. C.). Mus. Cuming.

9. NASSA NANA, A. Adams. *N. testā ovatā, spirā acutā; anfractibus rotundatis, rufescente, fascia pallida luteola ornatā, longitudinaliter plicata, transversim semistriata; labio cum callo expanso tenui tecto; columellā rugosula; labro marginato, intus sulcata.*

Hab. Dumaguete, island of Negros, coarse black sand, 11 fathoms (H. C.). Mus. Cuming.

10. NASSA BELLULA, A. Adams. *N. testā ovatā, spirā acuminate, acutā; anfractibus angulatis, pallidula, fascia luteola ornatā, longitudinaliter plicata, transversim lirata; interstitiis concinna longitudinaliter striatis, labio callo magno tecto; columellā rugosa; labri margine rugoso calloso, intus crenulato.*

Hab. Catbalonga, island of Samaar, under stones, low water. Mus. Cuming.

11. NASSA BIMACULOSA, A. Adams. *N. testā suborbiculari, apud dorsum valde convexa, nodosa; spirā acutā, longitudinaliter sub-*

plicatā, anticē transversim sulcatā, olivaced, fasciā pallidā transversā cinctā, labio cum callo crasso albo magno suborbiculari cincto; columellā lāvi, anticē uniplicatā; labro valde incrassato marginato, anticē sinuato, intus lirato, extus maculīs duabus rufofuscis ornato.

Hab. Island of Siquijor, on mud-banks (*H. C.*). Mus. Cuming.

12. **NASSA LEPTOSPIRA**, A. Adams. *N. testā ovatā, apud dorsum convexā, nodosā; spira productā, acutā, lutescente longitudinaliter plicatā, anticē transversim striatā, labio cum callo luteo crasso tecto; columellā corrugatā, labro intus lirato.*

Hab. Ilo Ilo, island of Panay, on mud-banks, low water (*H. C.*). Mus. Cuming.

Subgenus **ALECTRION**, Montfort.

Shell bucciniform; spire elevated; inner lip with the callus moderately developed; outer lip dentate, or serrate at the margin.

A. Shell pillose; inner lip spread.

1. **NASSA PAPILLOSA**, Linn.

Bucc. papillosum, Linn.; List. Conch. t. 969. f. 23.

Hab. Island of Capul, on the reefs (*H. C.*).

2. **NASSA NASSOIDES**, Reeve.

Bucc. nassoides, Reeve, Conch. Icon. Mon. Buccinum, pl. f.

Hab. —?

3. **NASSA NODIFERA**, Powis.

Nassa nodifera, Powis.

Hab. Philippines.

4. **NASSA MONILIS**, Kien.

Bucc. monile, Kien. Mon. Bucc. pl. 11. f. 40.

Hab. New Guinea.

5. **NASSA CRENULATA**, Brug.

Bucc. crenulatum, Brug.; Petiver, Gaz. t. 64. f. 8; Kien. Mon. pl. 23. f. 90, pl. 14. f. 49.

Hab. Indian Seas.

6. **NASSA HIRTA**, Kiener.

Bucc. hirtum, Kien. Mon. Bucc. pl. 19. f. 72.

Hab. New Holland.

7. **NASSA JACKSONIANA**, Kiener.

Bucc. Jacksonianum, Kien. Mon. Bucc. pl. 19. f. 73.

Hab. Port Jackson, New Holland.

8. **NASSA VARIABILIS**, Phil.

Bucc. variabile, Phil. En. Moll. Sicil. vol. i. p. 221.—*B. subdianum*, Bivon.—*B. stolatum*, Gmel.—*B. zonale*, Brug.—*B. costu-*

latum, Brocc.—*B. angulatum*, Brocc.—*B. Cuvieri*, Payr.—*B. Ferus-saccii*, Payr.—*B. corrugatum*, Brocc.

Hab. Mediterranean.

9. **NASSA COMPLANATA**, Powis.

Nassa complanata, Powis.

Hab. Atacamas, West Columbia.

10. **NASSA SEMINODOSA**, A. Adams. *N. testa ovato-conica, acuminata, laevi, nitida, fulvo fuscescente; suturæ tuberculis moniliformibus ornata; longitudinaliter plicata, plicis supernæ subnodulosis; anfractu ultimo anticè transversim sulcato, labio laevi, cum callo tenui expanso obtecto, labro anticè dentato intus lirato.*

Hab. Island of Annaa, South Seas, on the reefs (H. C.). Mus. Cuming.

B. Shell smooth, polished.

1. **NASSA GLANS**, Linn.

Bucc. glans, Linn.; List, Conch. t. 981. f. 40; Kien. Mon. pl. 15. f. 52.

Hab. Island of Ticao, Philippines, on the reefs (H. C.).

2. **NASSA SUTURALIS**, Lam.

Bucc. suturale, Lam. Chem. pl. 125. f. 1199, 1200; Kien. Mon. pl. 24. f. 96.

Hab. Swan River.

3. **NASSA ELEGANS**, Kien.

Bucc. elegans, Kien. Mon. Bucc. pl. 24. f. 97.

Hab. Indian Ocean.

4. **NASSA RUFULA**, Kien.

Bucc. rufulum, Kien. Mon. Bucc. pl. 24. f. 95.

Hab. Swan River.

5. **NASSA LAETA**, Philippi.

Bucc. laetum, Phil. Zeit. f. Mal. 1848, p. 141.

Hab. —?

6. **NASSA BRONNII**, Philippi.

Bucc. Bronnii, Phil. Zeit. f. Malac. 1848, p. 137.

Hab. Corrigidor, 6 fathoms, coarse sand (H. C.).

7. **NASSA GAUDIOSA**, Hinds.

Nassa gaudiosa, Hinds, Moll. Voy. Sulph. pl. . f. .

Hab. Straits of Malacca. .

8. **NASSA PICTA**, Dunker.

Buccinum pictum, Dunker, Phil. Abild. (Buccinum), t. 2. f. 6.

Hab. Philippines. Mus. Cuming.

9. **NASSA REEVIANA**, Dunker.*Buccinum Reevianum*, Dunker, Phil. Abild. (Buccinum), t. 2. f. 3.*Nassa filosa*, Gray MSS.*Hab.* Philippines. Mus. Cuming.

10. **NASSA MUCRONATA**, A. Adams. *N. testa ovato-conica, sublævi, nitida, longitudinaliter plicata, lutescenti fuso variegata; anfractibus rotundatis, ultimo gibboso; spiræ acutæ, mucronata; labio lævi; labro intus lirato.*

Hab. Dumaguete, isle of Negros, 11 fathoms, black sand (H. C.).
Mus. Cuming.

11. **NASSA OBLIQUATA**, A. Adams. *N. testa ovato-conica, obliqua, lævissima, nitida; lineis fuscis transversis, fascia pallida ornata, cinerescente, albo variegata; labio lævi, simplici; labro intus lirato.*

Hab. Cagayan, province of Misamis, island of Mindanao, sandy mud, 25 fathoms (H. C.). Mus. Cuming.

12. **NASSA PUNCTATA**, A. Adams. *N. testa ovato-conica; spiræ acuminata, lævi, cinereæ, albido punctata, lineolis fuscis transversis ornata; labio callo tenui expanso tecto; columella rugosa; labro extus incrassato, intus lirato.*

Hab. Puerto Galero, province of Albay, isle of Luzon, coarse sand, 6 fathoms (H. C.). Mus. Cuming.

13. **NASSA LENTIGINOSA**, A. Adams. *N. testa ovato-conica; spiræ acuminata, lævi, nitida, lutescente aut cinerescente, lineis undulatis confertis picta, lineolis fuscis transversis ornata; labio cum callo tenui tecto; columella anticæ rugosa; labro margine incrassato, intus valde lirato.*

Hab. Masbate, 7 fathoms, sandy mud (H. C.). Mus. Cuming.

14. **NASSA LUCTUOSA**, A. Adams. *N. testa ovata, elongata, acuminata, subnitida, transversim sulcata, nigrante nonnunquam fasciis albo-articulatis ornata; anfractibus planulatis; labio callo nitido obtecto; columella anticæ biplicata et tuberculis tribus instructa; labro extus incrassato, intus valde lirato.*

Hab. Cagayan, province of Misamis, isle of Mindanao, under stones on the reefs (H. C.). Mus. Cuming.

15. **NASSA STOLIDA**, A. Adams. *N. testa ovato-conica; spiræ acuminata, solidæ, cinereæ, fuso maculata, longitudinaliter plicata; aperturæ anticæ effusa; labio reflexo, lævi, valde calloso; labro intus lævi, fuso alboque fasciato.*

Hab. —? Mus. Cuming.

16. **NASSA DISTORTA**, A. Adams. *N. testa ovato-conica, nitida; spiræ acuminata, distorta, pallida, cinereo variegata, lineis fuscis transversis ornata; aperturæ anticæ valde effusa; labio lævi, anticæ biplicato; labro anticæ producto, intus lirato.*

Hab. —? Mus. Cuming.

17. **NASSA MARMOREA**, A. Adams. *N. testā ovato-conicā, lāvi, nitidd; spirā subacuminatā, albidd, fusco marmoratā, fasciis duabus pallidis ornatā; anfractibus planiusculis; labio corrugato; labro extus varicoso, intus lirato.*

Hab. Cagayan, Mindanao, 25 fathoms, sandy mud (*H. C.*). Mus. Cuming.

18. **NASSA SPIRATA**, A. Adams. *N. testā ovato-conicā, acuminatā, lāvi, nitidd, albidd, luteo-fusco nebulosā; anfractibus convexiusculis, prope suturas angulatis; labio lāvi; labro intus lirato, extus incrassato, anticē margine simplici non dentato.*

Hab. Swan River. Mus. Cuming.

C. Shell smooth or ribbed. Inner lip defined.

1. **NASSA OLIVACEA**, Brug.

Bucc. olivaceum, Brug. Favanne Conch. pl. 33. f. 2; Kien. Mon. Bucc. pl. 15. f. 53.

Hab. Philippines.

2. **NASSA CANALICULATA**, Lamarck.

Bucc. canaliculatum, Lam. Chem. Conch. pl. 125. f. 1194-95; Kien. Mon. Bucc. pl. 23. f. 89.

Hab. Philippines.

3. **NASSA UNICOLOR**, Kiener.

Bucc. unicolor, Kien. Mon. Bucc. pl. 19. f. 69.

Hab. Australia.

4. **NASSA ORNATA**, Kiener.

Bucc. ornatum, Kiener, Mon. Bucc. pl. 124. f. 168.

Hab. Tranquebar, Ceylon, Indian Seas.

5. **NASSA EXILIS**, Powis.

Nassa exilis, Powis.

Hab. —?

6. **NASSA RUFOCINCTA**, A. Adams. *N. testā ovato-conicā, subturrītā, albidd, fasciā transversā rufā ornatā, longitudinaliter plicatā, transversim striatā; anfractibus subrotundatis; labio callo albo circumscripto tecto; labro extus marginato, intus sulcato.*

Hab. Honduras (*Dyson*). Mus. Cuming.

7. **NASSA MICANS**, A. Adams. *N. testā ovato-fusiformi, albida, lāvi, nitidissimā; anfractibus convexiusculis supremis costellatis; labio callo tenui tecto; labro anticē crenulato, intus lirato.*

Hab. Cagayan, Misamis, Mindanao, 25 fathoms, sandy mud (*H. C.*). Mus. Cuming.

8. **NASSA PALLIDULA**, A. Adams. *N. testā ovatā, subacuminatā, pallida, lāvi, anfractu ultimo anticē transversim sulcata; suturā*

canaliculata; *labio cum callo circumscripto tecto*; *columellā simplici*; *labro extus marginato, intus lirato*.

Hab. Malacca, coarse sand, 10 fathoms (H. C.).

9. **NASSA COMPTA**, A. Adams. *N. testā ovato-conicā, subturrītā, lāvi, nitiddā, rufescente pallidē variegatā; anfractibus convexiusculis, supremis costellatis; labio cum callo circumscripto tecto; columellā anticē corrugatā; labro margine incrassato, albo, subreflexo.*

Hab. Cape St. Antonio, Africa.

10. **NASSA SUCCINCTA**, A. Adams. *N. testā ovatā, subturrītā, lāvi, cinerescente; fasciā pallidā, cinctā, anfractibus planulatis, supremis costellatis; suturā subcanaliculata; labio cum callo incrassato circumscripto tecto; columellā dentato-rugosā; labro posticē inflexo, anticē valde sinuato et dentato, extus limbato, intus lirato.*

Hab. Masbate. Mus. Cuming.

11. **NASSA ZONALIS**, A. Adams. *N. testā ovato-acuminatā, lāvi, nitiddā, longitudinaliter striatā; anfractu ultimo transversim sulcato; lutescente, fasciis tribus transversis rufo-fuscis cinctā; labio cum callo tenui expanso tecto; columellā lāvi; labro extus incrassato, intus lirato.*

Hab. Isle of Ticao, on the reefs (H. C.). Mus. Cuming.

12. **NASSA SERTULA**, A. Adams. *N. testā ovatā, acuminatā, lāvi, nitiddā, fulvā, albo nebulosā; anfractibus convexiusculis, supremis costellatis; labio cum callo circumscripto tecto; columellā transversim corrugatā; labro extus incrassato, intus lirato.*

Hab. Masbate, on the reefs (H. C.). Mus. Cuming.

13. **NASSA SEMIPLICATA**, A. Adams. *N. testā ovato-conicā, cinctā, fasciā pallidā transversā ornatā, nitiddā, sublāvi, longitudinaliter plicatā, plicis in anfractu ultimo sāpē evanidis, interstitiis transversim striatis; labio callo circumscripto; columellā transversim corrugato-plicatā; labro extus albo marginato, intus lirato.*

Hab. Chusan (Benson). Mus. Cuming.

14. **NASSA CINNAMOMEA**, A. Adams. *N. testā ovato-acuminatā, cinnamomedā, lāvi, nitiddā, levigatā, sempellucidā, anfractibus convexis; labio simplici; labro extus marginato, intus sublirato.*

Hab. Dumaguete, isle of Negros, under stones, low water (H. C.).
Mus. Cuming.

15. **NASSA BADIA**, A. Adams. *N. testā ovato-acuminatā, lāvi, nitiddā, castaneā; anfractibus planis, supremis longitudinaliter plicatis, anfractu ultimo transversim striato; labio simplici vix calloso; labro extus marginato, intus plicato.*

Hab. Sinaat, province of North Ilocos, island of Luzon, on the reefs (H. C.). Mus. Cuming.

16. **NASSA MITRALIS**, A. Adams. *N. testā ovato-conicā, acuminatā, fusca, sublævi, longitudinaliter semiplicatā; anfractibus planiusculis, ultimo anticē transversim sulcato; labio subcorrugato; labro extus marginato, intus valde lirato.*
Hab. Isimimalan, isle of Negros, on the mud-banks (H. C.). Mus. Cuming.

17. **NASSA SEROTINA**, A. Adams. *N. testā turritā, acuminatā, serotinā, anfractu ultimo anticē cingulis duabus elevatis articulatis ornato; transversim substriatā, longitudinaliter plicatā, plicis rotundis subdistantibus; aperturā albd; columellā lævi, subcallosā; labro extus incrassato, intus lirato.*
Hab. Australia.

18. **NASSA PULCHELLA**, A. Adams. *N. testā turritā, acuminatā, nitida, albida, luteo variegatā, fasciā fuscā transversā ornatā; longitudinaliter plicatā, plicis subdistantibus rotundatis tuberculis albis transversis instructis; labio calloso nitido; labro extus marginato, intus lirato.*
Hab. Cape of Good Hope. Mus. Cuming.

19. **NASSA TERETIUSCULA**, A. Adams. *N. testā subturritā, acuminatā, lutescente aut plumbata, fasciā angustā fuscā transversā ornatā; lævi, nitida, longitudinaliter valde plicatā; labio cum callo mediocri tecto; columellā anticē tortuosa, plicatā; labro extus limbato, intus lirato.*
Hab. Eastern Seas. Mus. Cuming.

20. **NASSA VARICIFERA**, A. Adams. *N. testā turritā; spira acuminatā, pallida, fasciis fuscis duabus transversis ornata; anfractibus subplanulatis, varicibus albis, spiruliter instructis; suturā canaliculata; columellā anticē plicis tribus transversis; labro extus marginato, posticē angulato, intus valde lirato.*
Hab. Eastern Seas.

21. **NASSA SCALARIS**, A. Adams. *N. testā ovato-conicā, subturritā, pallida, rufo-fusco fasciatā; longitudinaliter costata, transversim lirata; anfractibus rotundatis, tuberculis moniliformibus apud suturam; suturā subcanaliculata; labio cum callo subexpanso tenui tecto; columellā corrugata, anticē biplicata; labro anticē crenulato, intus lirato.*
Hab. Island of Corrigidor, 7 fathoms, coarse sand (H. C.). Mus. Cuming.

22. **NASSA PLANOCOSTATA**, A. Adams. *N. testā ovato-conicā, cinerescente, fasciā rufo-fuscā transversim cinctā; costellis planis confertis longitudinalibus, interstitiis concinnae clathratis ornata; labio cum callo circumscripto tecto; columellā transversim plicato-dentata; labio anticē denticulato, intus valde lirato.*
Hab. Payta, Peru, under stones, low water (H. C.). Mus. Cuming.

D. Shell scalariform, cancellated.

1. **NASSA SCALARIFORMIS**, Valenc.*Buccinum scalariforme*, Val. ; Kiener, Monograph Bucc. pl. 21.

f. 80.

Hab. New Guinea.2. **NASSA ROISSYI**, Deshayes.*Bucc. Roissyi*, Belang. Voy. aux Ind. Or. pl. 3. f. 3, 4 ; Kiener, Mon. Bucc. pl. 21. f. 82.*Hab.* Indian Ocean.3. **NASSA REEVEI**, A. Adams.*Bucc. elegans*, Reeve.*Hab.* — ?4. **NASSA NUCLEOLUS**, Philippi.*Bucc. nucleolus*, Philippi.*Hab.* — ?5. **NASSA NODATA**, Hinds.*Nassa nodata*, Hinds, Moll. Voy. Sulphur, pl. . f. .*Hab.* Malacca.6. **NASSA PERPINGUIS**, Hinds.*Nassa perpinguis*, Hinds, Moll. Voy. Sulphur, pl. . f. .*Hab.* Bay of Magdalena, California. Mus. Cuming.7. **NASSA MIGA**, Adanson.*Bucc. miga*, Adanson, Voy. au Senegal, pl. 8. f. 10 ; Kiener, Mon. Bucc. pl. 22. f. 87.*Hab.* Senegal. Mus. Cuming.8. **NASSA MYRISTICATA**, Hinds.*Nassa myristicata*, Hinds, Moll. Voy. Sulphur, pl. 9. f. 10, 11.*Hab.* Cape of Good Hope.9. **NASSA PALLIDA**, Powis.*Nassa pallida*, Powis.*Hab.* Panama, sandy mud, 6 fathoms. Mus. Cuming.10. **NASSA NODULIFERA**, Philippi.*Buccinum noduliferum*, Phil. Abild. (Bucc.) t. 1. f. 3.**11. NASSA ANGULIFERA**, A. Adams. *N. testa ovato-conica, sub-turrita, pallide fulva; fascia fusca cincta, transversim sulcata, longitudinaliter plicata, plicis distantibus, postice apud suturas angulatis; labio cum callo albo nitido tecto; labro margine sub-reflexo, intus crenulato.**Hab.* Galapagos Islands, 10 fathoms (H. C.). Mus. Cuming.

12. **NASSA NODICINCTA**, A. Adams. *N. testa ovato-turritā; spirā acuminatā, pallidā, lineis rufis transversis cinctā, transversim sulcatā; plicis distantibus longitudinalibus, apud suturas noduliferis ornata; labio cum callo albo lāvi nitido tecto; labro extus varicoso, intus lirato.*

Hab. Galapagos Islands, 7 fathoms (H. C.). Mus. Cuming.

13. **NASSA SANCTÆ HELENÆ**, A. Adams. *N. testa ovato-conicā, subturrītā; spirā productā; anfractibus rotundatis, albida rufo-variegatā, longitudinaliter costatā, costis distantibus subnodosis; anfractu ultimo anticē transversim sulcato; labio lāvi, calloso; columellā anticē uniplicatā; labro intus lirato.*

Hab. St. Helena, sandy mud, 20 fathoms (H. C.). Mus. Cuming.

14. **NASSA CINCTELLA**, A. Adams. *N. testa ovato-conicā, albida, lineis fuscis transversis cinctā, longitudinaliter valde plicatā, plicis distantibus, liris transversis albīs, interstitiis fuscis ornata; labio corrugato, vix calloso; labro extus varicoso, intus valde lirato.*

Hab. St. Helena, 20 fathoms, sandy mud.

15. **NASSA CORRUGATA**, A. Adams. *N. testa elongatā, subturrītā, fulvescente, rufo nebulosā; transversim liratā, longitudinaliter plicatā; plicis nodulosis; anfractibus convexiusculis; labio simplici, non calloso; labro intus lirato, margine crenulato; columellā tortuosa, anticē productā.*

Hab. Eastern Seas. Mus. Cuming.

16. **NASSA TURRITA**, A. Adams. *N. testa elongatā, subturrītā, pallidē fulvā; anfractibus rotundatis; suturā subcanaliculatā, longitudinaliter plicatā, transversim liratā, liris subnodulosis; labio cum callo tenui tecto; columellā anticē abruptē truncatā; labro intus valde lirato.*

Hab. —? Mus. Cuming.

17. **NASSA JAPONICA**, A. Adams. *N. testa turritā, pallidē fulvā, fasciā rufo-fusca cinctā; longitudinaliter plicatā, cingulis transversis ad plicas nodulosis ornata, interstitiis longitudinaliter striatis; labio subrugoso; columellā anticē productā; labro intus lirato.*

Hab. Japan (Dr. Siebold). Mus. Cuming.

18. **NASSA DENTICULATA**, A. Adams. *N. testa ovato-conicā, fulvescente rufo maculosā; anfractibus convexiusculis, longitudinaliter plicatā, transversim liratā, liris planis, interstitiis tenuissimè longitudinaliter striatis; labio cum callo albo nitido tecto, anticē producto, libero; labro intus lirato, margine denticulato.*

Hab. —? Mus. Cuming.

19. **NASSA NIVEA**, A. Adams. *N. testa ovato-conicā, candidā, nitida; anfractibus planulatis plicis longitudinalibus distantibus, transversim sulcatā; labio cum callo mediocri tecto, margine acuto*

productio; labro margine subcrenulato, intus lirato; columellā anticē triplicatā.

Hab. Batangas, island of Luzon, 21 fathoms, coarse sand (*H. C.*).
Mus. Cuming.

20. **NASSA PLICATELLA**, A. Adams. *N. testū ovato-conicā, fulvā; labro albido; anfractibus subrotundatis longitudinaliter plicatis transversiri liratis, liris ad plicas nodulosis; labio cum callo mediocris; columellā anticē uniplicatā; labro margine acuto, intus lirato.*

Hab. Wallwich Bay, Africa. *Mus.* Cuming.

Subgenus **TRITONELLA**, Adams; *Tritonia*, Fleming.

Shell turreted, cancellated; aperture rounded, not produced into an anterior canal; outer lip not dentate, with a marginal varix.

1. **NASSA DECUSSATA**, Kiener.

Bucc. decussatum, Kien. Mon. Bucc. pl. 30. f. 3.

Hab. Brisbane Water, East Australia (*Mr. R. Strange*).

2. **NASSA TRITONIFORMIS**, Kien.

Bucc. tritoniformis, Kien. Mon. Bucc. pl. 30. f. 2.

Hab. Senegal.

3. **NASSA ASCANIAS**, Brug.

Bucc. ascanias, Brug. Dict. no. 42.—*B. asperulum*, Brocc.—*B. macula*, Montag.—*N. rudis*, Gualt.—*B. Lacepedii*, Payr.—*Tritonia varicosa*, Fleming.—*B. coccinella*, Lam.—*B. incrassatum*, Müll.—*B. mirutum*, Penn.

Hab. Mediterranean.

4. **NASSA FASCIATA**, Lamk.

Bucc. fasciatum, Lam.; Gualtieri, pl. 43. fig. m; Kien. Mon. Bucc. pl. 22. f. 86.

Hab. New Holland.

5. **NASSA DENTIFERA**, Powis.

Nassa dentifera, Powis; Kien. Mon. Bucc. pl. f. .

Hab. South America.

6. **NASSA FESTIVA**, Powis.

Nassa festiva, Powis.

Hab. —?

7. **NASSA ANOMALA**, Reeve.

Triton anomalus, Hinds, Moll. Voy. Sulph. pl. 4. f. 13, 14.

Hab. Island of Quibo, Veragua.

8. **NASSA SCABRIUSCULA**, Powis.

Nassa scabriuscula, Powis.

Hab. —?

9. **NASSA MULTIGRANA**, Dunker.*Bucc. multigranum*, Dunker; Phil. Abild. t. 2. f. 13.*Hab.* —?10. **NASSA SIGNATA**, Dunker.*Bucc. signatum*, Dunker; Phil. Abild. t. 2. f. 17.*Hab.* —?11. **NASSA OBLIQUEPLICATA**, Dunker.*Bucc. obliqueplicatum*, Dunker; Phil. Abild. (Buccinum) t. 1. f. 13.*Hab.* —?12. **NASSA FUSCATA**, A. Adams. *N. testa ovata, spiræ acuminata, anfractibus convexiusculis, fuscæ, longitudinaliter plicata, transversim lirata, plicis ad liras tuberculatis, interstitiis transversim striatis; columella rugosæ; labro posticè sinuato, intus dentato-lirato.**Hab.* —? Mus. Cuming.Subgenus **TRITIA**, Risso.

Shell turreted; inner lip spreading; outer lip not dentate, without a marginal varix.

1. **NASSA RETICULATA**, Linn.*Bucc. reticulatum*, Linn.; List. Conch. t. 966. f. 21 a; Kien. Mon. Bucc. pl. 23. f. 91 & pl. 19. f. 71.*Hab.* Mediterranean.2. **NASSA GAYII**, Kiener.*Bucc. Gayii*, Kien. Mon. Bucc. pl. 21. f. 79.*Hab.* St. Helena, sandy mud.3. **NASSA SULCATA**, Kien.*Bucc. sulcatum*, Kien. Mon. Bucc. pl. f. .*Hab.* —?4. **NASSA CONCINNA**, Powis.*Nassa concinna*, Powis.*Hab.* Philippines.5. **NASSA TRIVITTATA**, Say.*Bucc. trivittatum*, Say.*Hab.* New York.6. **NASSA DEALBATA**, A. Adams. *N. testa ovato-conicæ, acuminata, subturreta, albida, fascia pallida lutea cincta; anfractibus planulatis longitudinaliter plicatis, plicis nodulosis, transversim liratis; columella tuberculato-dentata; labro extus incrassato, intus dentato-lirato.*

Hab. Dumaguete; isle of Negros, 11 fathoms, black coarse sand (H. C.). Mus. Cuming.

7. **NASSA COSTELLIFERA**, A. Adams. *N. testa ovato-conica, acuminata, albida, fuso-variegata, fascia fuscata in ultimo anfractu longitudinaliter costulata, transversim lirata; costellis nodulosis; anfractibus planiusculis; labio transversim corrugato-plicato; labro intus lirato.*

Hab. Curimas. Mus. Cuming.

8. **NASSA TRIFASCIATA**, A. Adams. *N. testa ovato-acuminata; spirae acuta, producta, pallide cerascente aut albida, fasciis tribus transversis rufis ornata, longitudinaliter subplicata, transversim sulcata; columella levata, callo cum nitido expanso tecta; labro margine acuto, intus lirato.*

Hab. Vigo Bay (M' Andrew). Mus. Cuming.

Subgenus **DESMOULEA**, Gray.

Shell subglobose, covered with a downy epidermis; spire short; apex papillary.

1. **NASSA ABBREVIATA**, Wood.

Bucc. abbreviatum, Wood, Chem. Conch. pl. 153. f. 1463; Kien. Mon. Buccinum, pl. 26. f. 105.

Hab. Indian Ocean.

2. **NASSA RETUSA**, Lam.

Bucc. retusum, Lam., Chem. Conch. t. 153. f. 1465; Kien. pl. 24. f. 94.

Hab. —?

3. **DESMOULEA PINGUIS**, A. Adams. *D. testa ovata, abbreviata, ventricosa; spirae brevi, apice mucronata; anfractibus gibbosum, lutescente albo variegata; epidermide fuscum villosum tecta, transversim striata; labio calloso; columella levata, anticem tuberculo unico, uniplicata; labro intus lirato.*

Hab. Senegal. Mus. Cuming.

4. **DESMOULEA PYRAMIDALIS**, A. Adams. *D. testa ovato-conica; spirae acuminata, apice obtuso, violascente, longitudinaliter evanide plicata, transversim sulcata; labio fuscum subcalloso simplici; labro extus marginato, intus lirato.*

Hab. —? Mus. Cuming.

5. **DESMOULEA CRASSA**, A. Adams. *D. testa ovato-conica, abbreviata, solidata, levata; spirae obtusa, apice violaceo; anfractibus superna gibbosum, rufescente albo variegata, transversim sulcata; labio cum callo crasso tecto; columella transversim lirata, anticem uniplicata, tuberculis duobus instructa; labro intus lirato.*

Hab. Japan. Mus. Cuming.

6. **DESMOULEA JAPONICA**, A. Adams. *D. testa ovata, levata, nitida, anticem transversim sulcata, fulvescente, maculis lineisque transversis fuscis ornata, albo variegata; labio anticem calloso; columella anticem tuberculis tribus instructa; labro extus incrassata, intus lirata.*

Hab. Japan (Siebold). Mus. Cuming.

Subgenus ACICULINA, A. Adams.

Shell turrit; inner lip with a circumscribed callus free anteriorly; outer lip with the margin thickened and flexuose.

1. ACICULINA COSTATA, A. Adams. *A. testd turritd, acuminatd, serotind, nitidd, longitudinaliter costatd, transversim sulcatd; labio calloso, anticè fusc, producto; labri margine subrecto, intus lirato.*

Hab. —? Mus. Cuming.

2. ACICULINA STRIATA, A. Adams. *A. testd ovato-turritd, fusc, fascid pallid transversd ornatd, anfractu penultimo gibboso ad suturas longitudinaliter plicatd transversim valde striatd; labio calloso; labri margine vix incrassato, intus lirato.*

Hab. San Nicholas, isle of Zebu, 5 fathoms, sandy mud (H. C.).
Mus. Cuming.

3. ACICULINA LABIATA, A. Adams. *A. testd turritd, acuminatd, nitidd, cinerescente, fascid pallid transversd ornatd, longitudinaliter costatd, costis ad suturam nodulosis, transversim sulcatd; labio fusc, calloso; labro margine incrassato, fusc, valde flexuoso, posticè sinuato, in medio producto.*

Hab. Malacca, coarse sand, 10 fathoms (H. C.). Mus. Cuming.

4. ACICULINA GLABRATA, A. Adams. *A. testd turritd, acuminatd, lèvi, nitidd, longitudinaliter substriatd, albida, fasciis cinerescentibus maculisque fuscis ornatd; labio calloso, anticè uniplicato; labri margine incrassato, flexuoso, in medio producto.*

Hab. Philippines. Mus. Cuming.

5. ACICULINA MACULATA, A. Adams. *A. testd turritd, lèvi, nitidd, albida, maculis luteo-fuscis longitudinalibus ornatd, transversim sulcatd, sulcis distantibus; labio calloso, anticè producto; columelld uniplicatd; labro extus marginato, intus lirato.*

Hab. Banang, Sargassinan, isle of Luzon, muddy sand, low water (H. C.). Mus. Cuming.

6. ACICULINA VITTATA, A. Adams. *A. testd turritd, albida, nitidd, fascid transversa fusca interruptd ornatd, transversim sulcatd, longitudinaliter costatd; labio calloso; columelld bituberculatd, et anticè valde uniplicatd; labro extus varicoso, intus dentato-lirato.*

Hab. Ticao, coral sand, 6 fathoms (H. C.). Mus. Cuming.

2. ON A NEW SPECIES OF THE GENUS MONTIFRINGILLA.
BY JOHN GOULD, F.R.S.

For a knowledge of this species we are indebted to Lord Gifford, by whom several examples were killed in Thibet. It is intimately allied to *Montifringilla Gebleri*, but differs in being of a larger size,

in the darker colouring of the head and face, and in the deeper tint of the back and rump ; the latter part is moreover ornamented with a patch of blood-red, which has suggested the specific name of *hæmatopygia* as an appropriate appellation ; it also differs from *M. Gebleri* in being destitute of the orange-red mark on the shoulders.

MONTIFRINGILLA HÆMATOPYGIA.

Face and forehead brownish black, gradually blending into the light greyish brown of the upper surface ; rump stained with blood-red ; upper tail-coverts brown, tipped with dull white ; tail dark brown, each feather margined externally with white ; wing-coverts hoary ; wings dark brown, the first four primaries narrowly edged with white, the next five primaries with a broad streak of white along the basal portion of their external webs, terminating in a line with the extremities of the secondaries, which are externally fringed with hoary ; spurious wing dark brown, margined at the base with whitish ; under surface very light brown, gradually becoming paler, until on the under tail-coverts the hue is buffy white ; bill and feet bluish black.

Total length, $6\frac{1}{2}$ inches ; bill, $\frac{1}{2}$; wing, $4\frac{1}{4}$; tail, $2\frac{1}{2}$; tarsi, 1.

3. ON SOME NEW SPECIES OF TROCHILIDÆ.

BY JOHN GOULD, F.R.S.

Mr. Gould exhibited some remarkably fine examples of the *Trochilus Jardinii* of Bourcier, and then characterized the following species :—

TROCHILUS (—?) AMABILIS.

Crown of the head shining metallic green ; chin black ; breast beautiful shining blue, with a line of lustrous green commencing at the angle of the bill, passing down the sides of the neck and surrounding the base ; upper surface bronzy green ; tail-coverts and central tail-feathers greenish bronze ; lateral tail-feathers brownish black ; wings purplish brown ; under surface like the upper, but less brilliant ; centre of abdomen and under tail-coverts grey, the centre of the latter bronzy green.

Total length, $3\frac{5}{8}$ inches ; bill, $\frac{3}{4}$; wing, $2\frac{1}{8}$; tail, $1\frac{1}{4}$.

Hab. New Grenada.

Remark.—About the size of *T. albirostris*.

PHAËTHORNIS GRISEOGULARIS.

Head, upper surface and wing-coverts bronzy brown ; upper tail-coverts rufous ; ear-coverts blackish brown ; wings purple brown ; base of the tail dark brown, the apical third of the two central feathers dark grey, tipped with white, the apical third of the next feather on each side grey on the inner web, buff on the outer web, and tipped with white ; the three lateral feathers on each side tipped with buff ; under surface sandy buff, with a wash of dull grey down the chin and a crescent of black across the breast ; upper mandible black ; basal

two-thirds of the under mandible yellow, apical third blackish brown; feet yellow.

Total length, $3\frac{3}{4}$ inches; bill, 1; wing, $1\frac{1}{2}$; tail, $1\frac{5}{8}$.

Hab. Columbia.

Remark.—Nearly allied to *P. Eremita* and *P. pygmaea*, but differing from them in being of a larger size, in the total absence of any crescentic black mark on the chest, in having the throat clouded with dark grey instead of buff, and the two central tail-feathers tipped with grey and their shafts black.

4. NOTE ON THE SUBORBITAL GLAND OF THE NYLGHAU.

By H. N. TURNER, Esq., JUN.

Among the cranial characters of the genus *Portax* I have adduced the want of a suborbital depression, and the existence of a smooth line running along the surface of the bone; and as I had observed appearances of a suborbital sinus in the living animal, which I could not detect in the dried specimens, I felt much interested in the examination of the parts in one that recently died in the Gardens, and which Mr. Mitchell kindly forwarded to me for dissection.

Externally there is a slight pit immediately in front of the orbit, and anteriorly to it a small longitudinal fold of the skin, in the middle of which is a little round pore, through which exudes a yellowish secretion, furnished by a gland placed just underneath. The gland itself is slightly larger than a hazel-nut, and is laid upon the surface of the bone without any fossa to receive it, but is firmly attached to the smooth line before observed. The *tendo oculi*, and a few fibres of the *orbicularis palpebrarum* are attached to it.

The small pit immediately in front of the orbit is merely the space below the *tendo oculi*, between the gland and the rim of the orbit. In the Nylghau, the existence of a “lacrymal sinus” has usually been acknowledged; but it affords a good example of the incertitude with which we can ever deny that it exists in a species of which fresh specimens have not been examined with a view to this character, and in which no traces of the organ are discernible, either in the dry skin, or in the existence of a fossa in the skull.

Pimlico, March 1851.

5. LETTER ON THE DEAL-FISH, FROM DR. DUGUID TO DR. BARKER. COMMUNICATED BY MR. YARRELL.

“ Kirkwall, 5 March 1851.

“ In April 1829, I received from Mr. Strang, Sanday, a specimen of a fish which had been found on the shores of that island, with a request that I should give him some information about it. He mentioned that he had met with many specimens during a series of years,—that it was well known to the natives of the island, by whom it was called the *Deal-fish*, and that they often found it thrown ashore, and even occasionally used it as food. I easily ascertained, from the works to which I had access, that it was a fish unknown to

the British *Fauna*, but could not determine what it really was. The specimen being a good deal mutilated about the head and abdomen, and in a state of partial decomposition, I did not attempt to preserve it, but drew up as correct a description of it as its condition admitted of, which I sent to Dr. Fleming, along with all the information about it which I could obtain from Mr. Straig, and also a somewhat rough drawing. Dr. Fleming wrote, of date 8th May, 1829, at once determining the fish to be the *Gymnogaster arcticus* of Brunnich, or *Vaagmaer*, as described by Cuvier in his 'Règne Animal,' ii. 246, a native of the seas of Iceland;—at the same time mentioning some slight discrepancies, which more perfect specimens, since procured, have completely removed. With my consent, he drew up a notice of it, which was inserted in the 4th volume of 'Loudon's Magazine of Nat. Hist.,' along with a plate from the drawing sent. This article I have not met with, having merely seen Yarrell's quotations from it. Since 1829 I have met with seven or eight specimens, some of which were mutilated by birds, and some quite entire, and from the latter I have ascertained the existence of ventral fins, which are exceedingly minute and rudimental, and easily overlooked, more especially if the specimen be not quite fresh and perfect. I am now therefore enabled to say with certainty that there can be no doubt of the identity of the fish occurring in these islands with the *Vaagmaer*, as described and figured in Yarrell's Supplement to the 1st edition of his 'British Fishes,' from information supplied by Professor Reinhardt of Copenhagen, and there named *Trachypterus vogmarus*. In the first figure, given at page 14, the ventral fins are much too long and conspicuous, but they are quite correctly represented in the vignette at page 18. The late Dr. John Reid, of St. Andrews, published an article in the Annals of Nat. Hist., June 1849, describing a specimen of the *Trachypterus Bogmarus* thrown ashore on the coast of Fifeshire, in which he says, 'No unquestionably genuine specimen of this rare fish has, as far as I am aware, been hitherto found in the British seas; for the description and figure of the fishes thrown ashore in Orkney, supposed to be specimens of the Deal-fish or *Vaagmaer*, given by Dr. Fleming on the authority of Dr. Duguid, differ in so many important points from the *Vaagmaer* as must excite doubts as to their identity.' Now Dr. Reid has not stated what the important points of difference are between my description and that of Prof. Reinhardt. It is true there is one important point—important as determining the proper classification of the fish—the existence or non-existence of ventral fins. These I did not detect; but it is not surprising, considering their minuteness, and the mutilated condition of the only specimen I had then seen. We have at this moment three dried ones in the Orkney Museum, not so perfect as could be desired, but sufficiently so to determine this point, as well as the identity of the fish with the Icelandic *Vaagmaer*. It is strange also that Dr. Reid never mentions the existence of ventral fins in his specimen at all, and that also, while he denies that the fishes thrown ashore in Orkney are the *Deal-fish* or *Vaagmaer*, he should forget that the popular name *Deal-fish* is strictly of Orcadian origin."

6. ON AN UNDESCRIPTED SPECIES OF MEGAPODIUS.
BY L. LLEWELLYN DILLWYN, Esq., F.G.S., F.Z.S. ETC.

(Aves, Pl. XXXIX.)

My friend Mr. James Motley, who is now conducting the operations of the Eastern Archipelago Company in Labuan, has lately sent me home a box of zoological specimens which he has collected in that island, and among the birds was the pair of the Megapodus, one of which I now produce; it is, I believe, identical with the species in the British Museum sent home by Mr. Cuming from the Philippine Islands. In the catalogue accompanying the specimens, and in several letters which I have received from him, he has described some of the habits of these curious birds, and deeming that original observations, however scanty, on the habits of almost any animal from that remote region might not be uninteresting to the Society, I have abstracted from his communications to me the following notice respecting them:—

These birds are said to be principally confined to small islands, and to such more especially as have sandy beaches; they are not uncommon in Labuan, but are, however, very rarely to be seen, as they are very shy, and frequent dense flat parts of the jungle, where the ratans grow and where the luxuriance of the vegetation renders concealment easy.

The Malays snare them by forming long thick fences in unfrequented parts of the jungle; in these they leave openings at intervals in which they place traps; the birds, running through the cover in search of food, meeting the obstruction caused by the fence, run along it till they come to one of the openings, through which they push their way and are trapped.

Their food principally consists of seeds and insects.

In walking they lift their feet very high from the ground, and set up their backs something like guinea fowls; they frequently make a loud noise, like the very loud screech of a chicken when caught.

They are very pugnacious, and fight with great fury by jumping upon one another's backs and scratching with their long strong claws.

The eggs are of a fine dark cream-colour, and of very large size, three of them weighing nearly as much as a full-grown bird. According to the general account given to Mr. Motley by the Malays, each bird lays about eight or ten at each time of breeding; the place they select for depositing them is always situated near the beach, and close within the edge of the jungle, and here they bury them in the sandy soil to the depth of about eighteen inches; over the place where they are thus buried the bird collects a large heap of shells and rubbish, so that a person who has seen their nest has no difficulty in finding it again; the eggs thus deposited are left to be hatched by the heat of the sun, and this the natives assert requires between three and four months to complete. Mr. Motley himself found upon breaking an egg which had been thus situated for nearly six weeks, that it contained merely the embryo of a chick, about as much advanced as that of a hen's egg at four days. Some other eggs which



J. Wolf lith.

MEGAPODIUS CUMINGI, *Dillw.*

M. & N. Hanhart Imp'

were brought him, but which he had no means of ascertaining how long they had been laid, he buried in a box of sand about 3 feet deep and exposed to the weather. At the end of about three weeks a young bird came up, not downy, but covered with little shafts or pens ready to form feathers. One of the Malays employed by Mr. Motley saw it emerge, and said that it just shook off the sand and ran away so fast that it was with difficulty caught. On the next day, when Mr. Motley first saw it, it appeared to him to be about half-grown. From the first it fed itself without hesitation, scratching and turning up the earth like an old bird. Two more afterwards emerged in the same state. According to Mr. Motley, the sexes are alike, except that the naked skin about the head is redder in the male than in the female.

In his investigations respecting the nidification of these birds, Mr. Motley was much assisted by Mr. Low, who is resident in the island.

As the Philippine specimens brought home by Mr. Cuming have not yet been characterized, I propose to name this species

MEGAPODIUS CUMINGII.

Sp. Char. Olivaceous brown above; blackish slate colour with a slight olivaceous tinge below; the feathers on the throat and nape are thinly dispersed, so as to leave that part nearly bare; on the hind head the feathers are somewhat lengthened, forming a kind of crest; bill black at the base, yellowish towards the tip; legs, feet and claws black; the bare skin about the head is redder in the male than in the female.

	in.	lin.
Length from the tip of the bill to the end of the tail, about	14	0
— of bill from gape	1	1
— of bill from front	0	10
— of wings	8	6
— of tail, not quite	3	0
— of tarsus	2	1
— of middle toe	1	11
— of hallux	1	5

The front toes are nearly equal, the middle toe being rather the longest, and the inner one shortest.

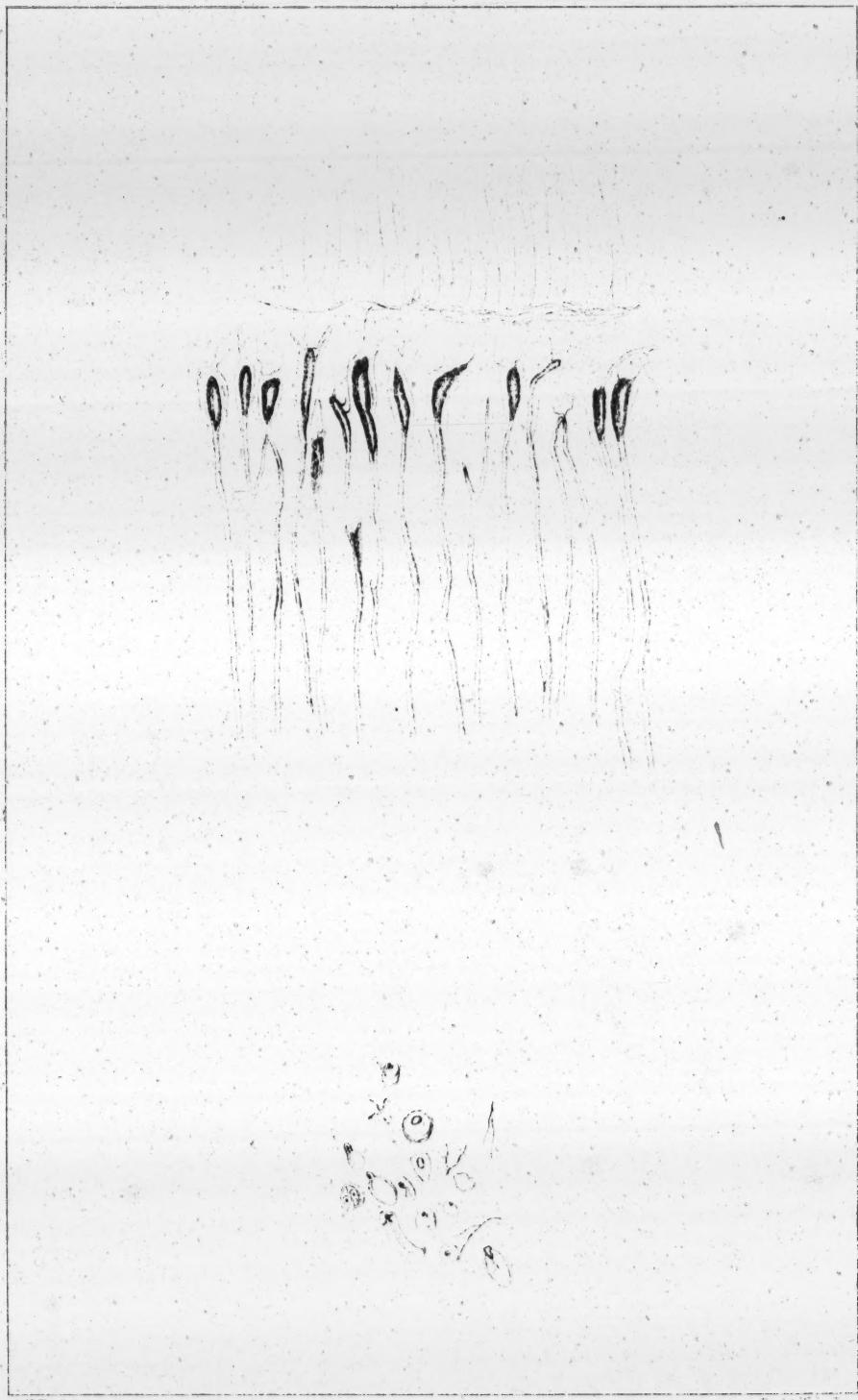
To the foregoing account some additional details of considerable interest may be subjoined. These details, although dated Labuan, July 1850, were not received until after Mr. Dillwyn's communication:—

**EXTRACT FROM A LETTER FROM MR. HUGH LOW, DATED
LABUAN, 4TH OF JULY, 1850.**

“ I have been using great exertions to procure for the Earl of Derby a very remarkable Gallinaceous bird, the existence of which I ascertained only three months back; having no books I am unable to refer to its genus, but it is nearer a Guinea fowl than anything else. I heard from the natives that such a bird existed, and that its eggs

were occasionally to be procured. I offered a dollar each for all they would bring me; and first one was brought, afterwards five, but I could not succeed in hatching either of these under fowls. The first, after having been set upon for a month, was picked to pieces by its foster-parent, and the chick had apparently but just begun to form. The five eggs were addled. Having learned that the birds abounded on a small island, about a hundred miles along the coast, I hired a boat and five men, and sent them, about fourteen days since, with snares, &c., to endeavour to catch some of the old birds and to seek for the nests, this being the laying season, and to gather plants of *Phalcinopsis*, which grows on the same island (Pulo Tigu and Pulo Guya). They returned yesterday, bringing with them 102 eggs and only two birds, both of which had their legs injured by the snares. The sight of the eggs and birds have perfectly astonished me, the body of the former being no larger than that of a bantam, while the egg is as long, though not so broad, as that of a Chinese goose. The men say that on the different islands they visited they found a good many nests, which are placed at a little distance from the sea-shore, in the jungle of small islands, the spot being invariably marked by a large collection of sticks and branches. The eggs are found about three feet deep in the sand, and the men assure me that the bird has no communication with them except by rasping away the sand. The man I employed has lived all his life on small islands, hunting for tortoise-shell, and well knows the habits of the bird; he says the eggs are hatched entirely by the sun's heat, or rather the heat in the sand. One of the birds he brought died this morning, and I shall put its skin together with some of the eggs in a box, that you may send them to Earl Derby. I do not like to take the liberty of writing to his lordship myself, but if I can succeed in getting a lot of young birds, I shall not fail to send them to him by the very first opportunity. I have placed some of the eggs under fowls, and some in sand out of doors; some also in sand in a warm house, where I can regulate the temperature; and I have hopes of rearing, or at least of hatching, some of the chicks, if the eggs are still good: but I think that by sending the men again in three months' time with snares I might catch a lot of the young ones hatched naturally, and be able to rear them. The bird is said not to be found on the mainland: the eggs are reported excellent eating.

"Aug. 12. Of the eggs I wrote to you so much about last mail, one only has hatched: the chick came up full-fledged from under three feet of sand, and immediately ran about with the most surprising activity. It eats rice, ants' eggs, &c. with the greatest avidity, and as it is now three weeks old, I have every hope of preserving it. More of the eggs appear to have chickens in them, and I hope will hatch. The bird, as I have ascertained, is an undescribed species of *Megapodius*."



G. H. Ford, Ills.

Bonh & Gess, Eng.

Molar tooth of the American Tapir
section through the crown.

April 8, 1851.

Professor Thomas Bell, Sec. R.S., in the Chair.

The following papers were read:—

1. ON THE STRUCTURE OF THE TEETH OF THE AMERICAN AND INDIAN TAPIRS. BY JOHN TOME, F.R.S.

(*Mammalia, Pl. XXIX.*)

It is now upwards of fifteen years since the attention of physiologists and comparative anatomists was drawn to the structure of the tissues which enter into the composition of the dental organs. In 1678 Leeuwenhoek communicated a paper to the Royal Society, on the Structure of the Teeth and other Bones, in which he described the dentinal tubes. His researches, however, were not confirmed by subsequent observers, and indeed were almost entirely overlooked until the period to which I have referred. Purkinjé, in 1835, confirmed the correctness of Leeuwenhoek's observations, at the time unconscious that the tubular structure of the dentine had been previously recognised. He also described the structure of the cementum.

Prof. Retzius was in the same year engaged in examining the structure of the dental tissues, and published the results in 1836. In 1837 Prof. Retzius published a work on the subject, the substance of which was in 1839 printed in our own language by Mr. Nasmyth.

In the latter part of 1837 I was engaged in examining the dental tissues, at that time unconscious that the subject had occupied the attention of the German or Swedish anatomists. In June 1838 the results of my examination were read before the Royal Society. In September of the same year, Prof. Owen read a paper on the Structure of the Teeth, before the British Association. In 1840 the publication of Prof. Owen's 'Odontography' was commenced, and completed in 1845. In this work will be found descriptions of the structure of the teeth of animals belonging to each division of Vertebrata.

In these various essays the authors agreed generally in the main facts of dental structure, and in each successive publication new facts were related. Judging from the amount which had been published, it might have been concluded that the subject was well nigh exhausted. Such however was not the case: many blunders, in the hurry which is incident to a new subject, had been committed and required correction, while many important facts had failed to be recognised. Prof. Owen pointed out that in the Order Edentata the teeth are destitute of enamel, while it is present in the other mammalian orders, with the exception of a few isolated cases.

Having neglected the subject of dental structure for some years, in consequence of more urgent pursuits, in 1847 I again entered on the inquiry, which to me possessed great attractions, not only on account of various modifications which are to be found in the arrange-

